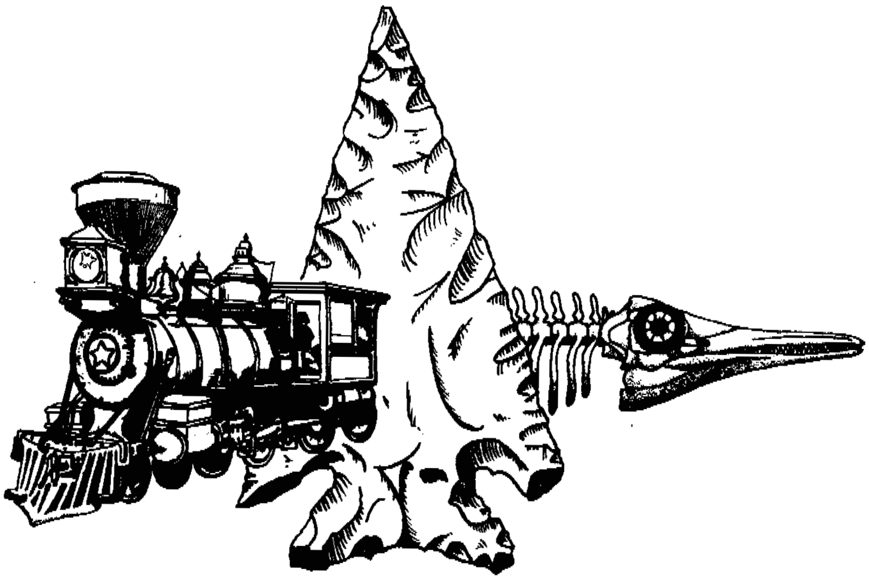
BUREAU OF LAND MANAGEMENT
NEVADA

CONTRIBUTIONS TO THE STUDY OF CULTURAL RESOURCES



AN EXAMINATION OF AMATEUR COLLECTIONS FROM THE CARSON SINK, NEVADA

TECHNICAL REPORT NO. 10

RENO, NEVADA 1983

BUREAU OF LAND MANAGEMENT
NEVADA

CONTRIBUTIONS TO THE STUDY OF CULTURAL RESOURCES
TECHNICAL REPORTS

No. 1 Studies at Adams-McGill Reservoir: Exercises in Applying Small Project Data to Archaeological Research. Robert York (Nov. 1977). ca. 18 pp.

No. 2 Archaeological Survey of Springs, Tonopah Resource Area. Roberta L. McGonagle and Lynda L. Waski (Feb. 1978). 60 pp.

No. 3 Oil and Gas/Geothermal Program Inventories. Nancy Botti, Peggy McGuckian, Robert York and Mark Henderson (June 1979). ca. 111 pp.

No. 4 Artifact Assemblages from the Pahranagat, Lincoln County, Nevada. Robert H. Crabtree and David D. Ferraro (Jan. 1980). 74 pp.

No. 5 Test Excavations at Painted Cave, Pershing County, Nevada. James C. Bard, Colin I. Busby and Larry S. Kobori (Feb. 1980). 153 pp.

No. 6 Emigrant Trails in the Black Rock Desert. Peggy McGuckian Jones (Apr. 1980). 110 pp.

No. 7 An Historic Overview of the BLM Shoshone-Eureka Resource Area, Nevada. Patrick H. Welch (1981). 47 pp.

No. 8 Archaeological Studies in the Cortez Mining District, 1981. Donald L. Hardesty and Eugene M. Hattori (1982). 59 pp.

No. 9 The History and Archaeology of Fenelon, a Historic Railroad Camp. Arnie L. Turner (1982). 61 pp.

No. 10 An Examination of Amateur Collections from the Carson Sink, Nevada. Robert L. Kelly (1983). 90 pp.

No. 11 An Archaeological Survey in the Mormon Mountains, Clark County, Nevada. Mary K. Rusco and Jeanne Munoz (1983). 78 pp.

Bureau of Land Management
Post Office Box 12000
300 Booth Street
Reno, Nevada 89520

FORWARD

This volume, "An Examination of Amateur Collections from the Carson Sink, Nevada" by Robert L. Kelly, Museum of Anthropology, University of Michigan, provides important information on a facet of the archaeological record in western Nevada currently not well documented. As a part of a graduate doctoral program, Kelly is conducting a regional study in the Carson Sink area. To supplement data gathered from field survey on public land in the region, some prominent private collections from the area have been inspected. This report contains data gathered from that element of the research plan.

The Carson Sink is one of several areas in the State that has regularly attracted ardent private artifact collectors. The surface collection and excavation of prehistoric artifacts by individuals (an illegal activity when conducted on public land without a Federal antiquities permit) who do not maintain accurate locational records greatly compromises the potential for reconstructing past lifeways at specific sites and on a regional scale in general. Kelly attempts to draw out the residual information still retained in these materials. It is intended that this information will provide additional baseline data for the assessment of archaeological sites found in the Carson Sink area which often lack distinctive stone tools in this region long frequented by collectors.

Richard C. Hanes
Nevada BLM State Archaeologist
Reno
June, 1983

PREFACE

This paper reports preliminary results and work-in-progress of an anlysis of materials in amateur and museum collections from the Carson Sink, Churchill County, Nevada. This analysis is part of the Carson-Stillwater Archaeological Project (CSAP) (see Kelly 1980; Kelly et al. 1982). Fieldwork for the project consisted of a survey of the eastern Carson Sink and the adjacent Stillwater Mountains, an area of nearly 1600 km^2. Work has been conducted in conjunction with excavations at Hidden Cave, located at the southern end of the survey area, under the direction of David Hurst Thomas (American Museum of Natural History).

The survey area has been intensively collected by amateurs and archaeologists for many years. Consequently, it was considered necessary that a perusal be made of the materials in museums and personal collections to determine the types of artifacts which had been systematically removed from sites in the area. A primary objective of this undertaking was to gather data which would augment the CSAP sample of projectile point metric and non-metric data. The research described herein should be considered preliminary and will be investigated in more detail at a later date.

Acknowledgements

I would like to thank Brian Hatoff and the BLM for their assistance in making this report possible. Mr. Donald Tuohy made collections at the Nevada State Museum available to me; Ms. Amy Dansie and Ms. Evelyn Seelinger helped locate collections. Ms. Sharon Edaburn graciously allowed me to disrupt the Churchill County Museum and gave a great deal of assistance. This report would not have been possible without the gracious assistance of the amateurs who opened up their homes, their picture frames and shoeboxes for me. I would especially like to thank Mr. George Luke, Herb and Norma Splatt, and Nina and Hammy Kent. Nevada is fortunate to have such people concerned with the state's prehistoric heritage. Lastly, the CSAP would not have been possible without the unfailing assistance of David Hurst Thomas and the American Museum of Natural History.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

PROJECT BACKGROUND

Research Objectives

The ultimate objective of the CSAP is to increase anthropologists' understanding of the way in which hunter-gatherers cope with different levels of resource fluctuations and the way in which adaptation to resource fluctuation affects cultural evolutionary change. The study of short-term variability in cultural systems is a critical issue. Hunter-gatherers do not adapt to their environment through a single settlement-subsistence strategy, but through a variety of such strategies (Binford 1980; Lee 1976; Winterhalder 1980). The complete range of these strategies will be manifested over long periods of time -- ten, twenty, or thirty years -- and thus constitute <u>long term adaptations</u> (see Kelly 1983; Binford 1982). The implementation of different strategies is made in response to short and long term fluctuations in the state of one or more environmental attributes (eg. faunal population oscillations). Long term adaptation is the principal context of evolutionary change since the system upon which selective pressures operate is not a single settlement-subsistence strategy, but the total of all strategies, short and long term.

The Carson Sink was chosen as a region within which to investigate this issue for a particular region. Based on the archaeology of marsh regions in the western Great Basin and the general nature of marsh ecology, I have suggested that marsh resources may have been used primarily as <u>back-up resources</u>. Thus, an archaeological study of the use of these resources may indicate how hunter-gatherers coped with the resource fluctuations inherent to the western Great

Basin.

Marsh Resources

The role of marsh resources in the diet of Great Basin aborigines has been a concern of archaeologists for more than a decade (Aikens 1978; Heizer and Napton 1970; Madsen 1982). All researchers have argued that marsh resources provide a subsistence base large enough and stable enough to support sedentary or nearly sedentary populations of hunter-gatherers. This argument is based on the assumptions that: (1) marsh ecosystems are among the most productive in the world in terms of their net rate of primary production; (2) the resources found in marshes are as nutritious as available terrestrial resources in terms of calories and protein; (3) marsh resources can be efficiently collected and processed; and (4) marsh ecosystems represent a stable, continually renewable resource base. There are, however, several errors in this argument.

My criticisms of this argument will be presented in greater detail in future publications. In brief, these criticisms are: (1) Ecosystems cannot be evaluated in terms of their overall productivity, but instead in terms of their <u>effective</u> primary production, that is, the amount of primary production available for human consumption. In marshes, much of the primary production is in the form of phytoplankton, and effective primary production is actually <u>low</u>. (2) In terms of nutrition, a comparison between marsh resources (fish, waterfowl, shellfish, cattail and tule) and terrestrial resources (pinyon, ungulates, grass seeds, lagomorphs) indicates that the latter are superior when evaluated conjunctively in terms of protein and calories. (3) Ethnographic sources indicate that marsh plants, fish and waterfowl require high labor costs for their harvest and processing, either because the resources require extensive "handling" before they are consumable, or because they are acquired through communal hunting techniques (eg. Harrington 1967: 212; M. Harrington 1933; Wheat 1967; Jones 1981). (4) Last, and most important, is a consideration of the stability and consequent predictability of marsh resources. All ecosystems undergo short-term change, oscillating between periods of resource abundance and scarcity. Research among extant hunter-gatherers indicates that a resource's predictability is just as important as its caloric or protein yield and energetic costs (O'Connell and Hawkes 1981; Winterhalder 1981). Great Basin terrestrial resources, especially pinyon (with its two-year seed production cycle) and ungulates (whose range movements and population levels can be monitored) are fairly predictable in their abundance and distribution. In contrast, general examinations of marsh ecology suggest that marsh environments are both unstable and unpredictable, particularly those found along shallow desert lakes (Mason 1957: 10; Correll and Correll 1972: 7). This contention is supported by numerous observations on marsh environments of the western Great Basin (Russell 1895: 118; Weide 1976: 177; Bryne, Busby and Heizer 1979; Morrison 1964; Billings 1945). In sum, it is incorrect to assume that hunter-gatherers lived sedentarily beside marshes because the resources there were superior to terrestrial ones. In fact, a different interpretation is indicated by the archaeology of the western Great Basin.

Archaeology of the Western Great Basin

There is a lengthy history of research in this area with excavations having been conducted at a number of caves and rockshelters overlooking lacustrine and/or marsh environments. In the Carson and Humboldt Sinks these sites include Lovelock Cave (Loud and Harrington 1929; Heizer and

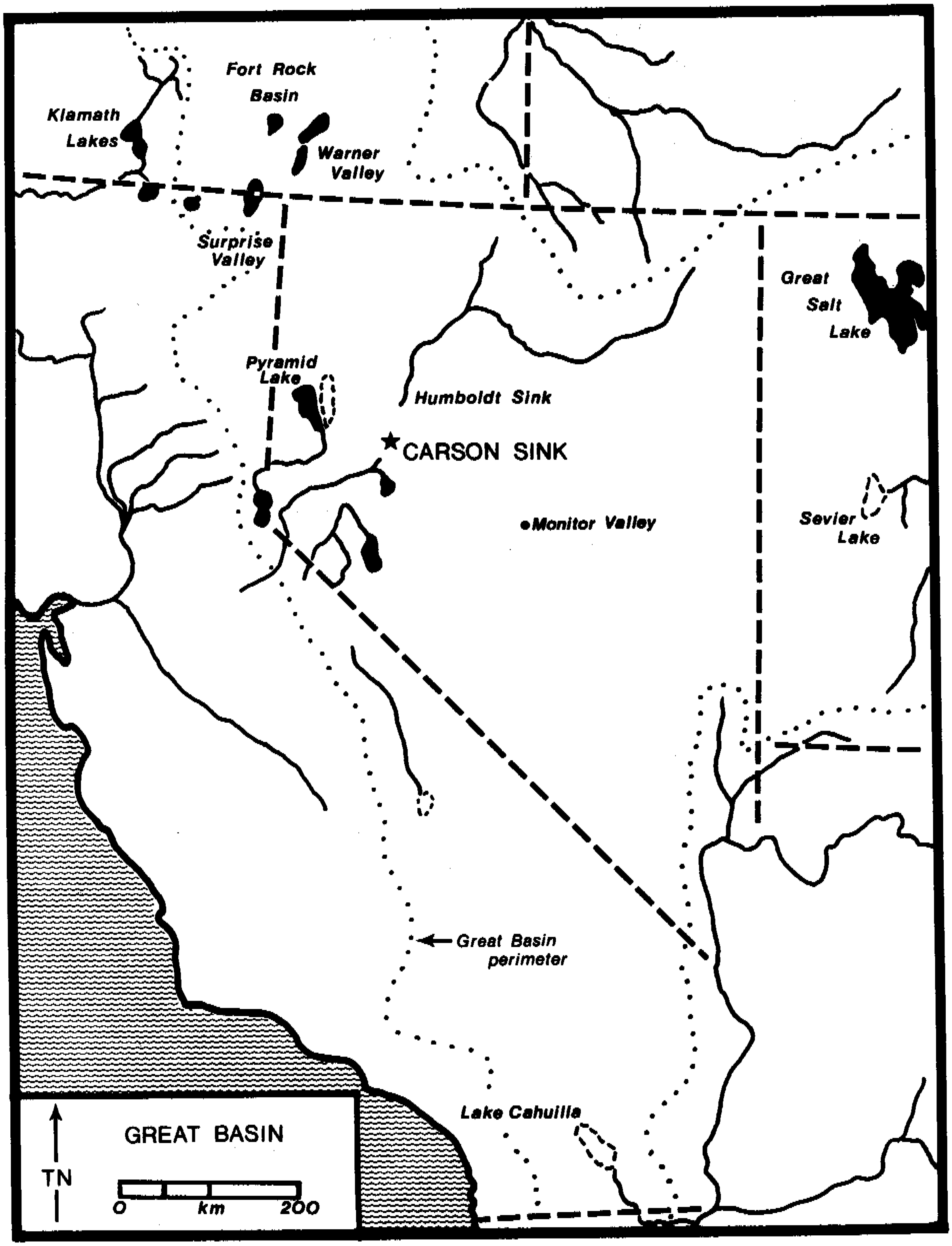
Napton 1970; Napton 1969), Humboldt Cave (Heizer and Krieger 1956), Hidden Cave (Grosscup and Roust 1952; Thomas n.d.) and several smaller sites (Tuohy 1974; Heizer 1956; Baumhoff 1958).

The archaeological deposits in caves situated around dry or extant marshes and lakes are very different from those uncovered in cave sites elsewhere in the Great Basin. Briefly, the caves around lakes are cache caves, and contain little else besides numerous pits, many still housing complete and usable tools and materials, stored for a future use. In Lovelock Cave, most of the cache pits contained implements associated with the exploitation of marsh resources -- fish hooks, nets and duck decoys, to mention a few. However, in Hidden Cave, most of the cached items are indicative of hunting, rather than waterfowling or fishing. Interestingly, Hidden Cave appears to have been used during an earlier time period than Lovelock Cave. One goal of the CSAP is to explain why this behavioral and temporal difference exists.

The high frequency of caching instances in the western Great Basin, an area of several lakes and marshes, may indicate that marsh resources were used predominantly in times of resource stress, the cached gear insuring that the technology for exploiting the marshes was always ready and available.

Future Objectives

The objectives of the project, however, go beyond an understanding of the prehistory of the Carson Sink. A comparison of the archaeology of various regions of the desert west (see fig. 1) where marsh exploitation is evident will be made in order to deduce the environmental factors which are conditioning the different forms of adaptation at different periods of time. This is important to the



1. Map of the Great Basin showing prominent marsh/lacustrine environments and location of the study area.

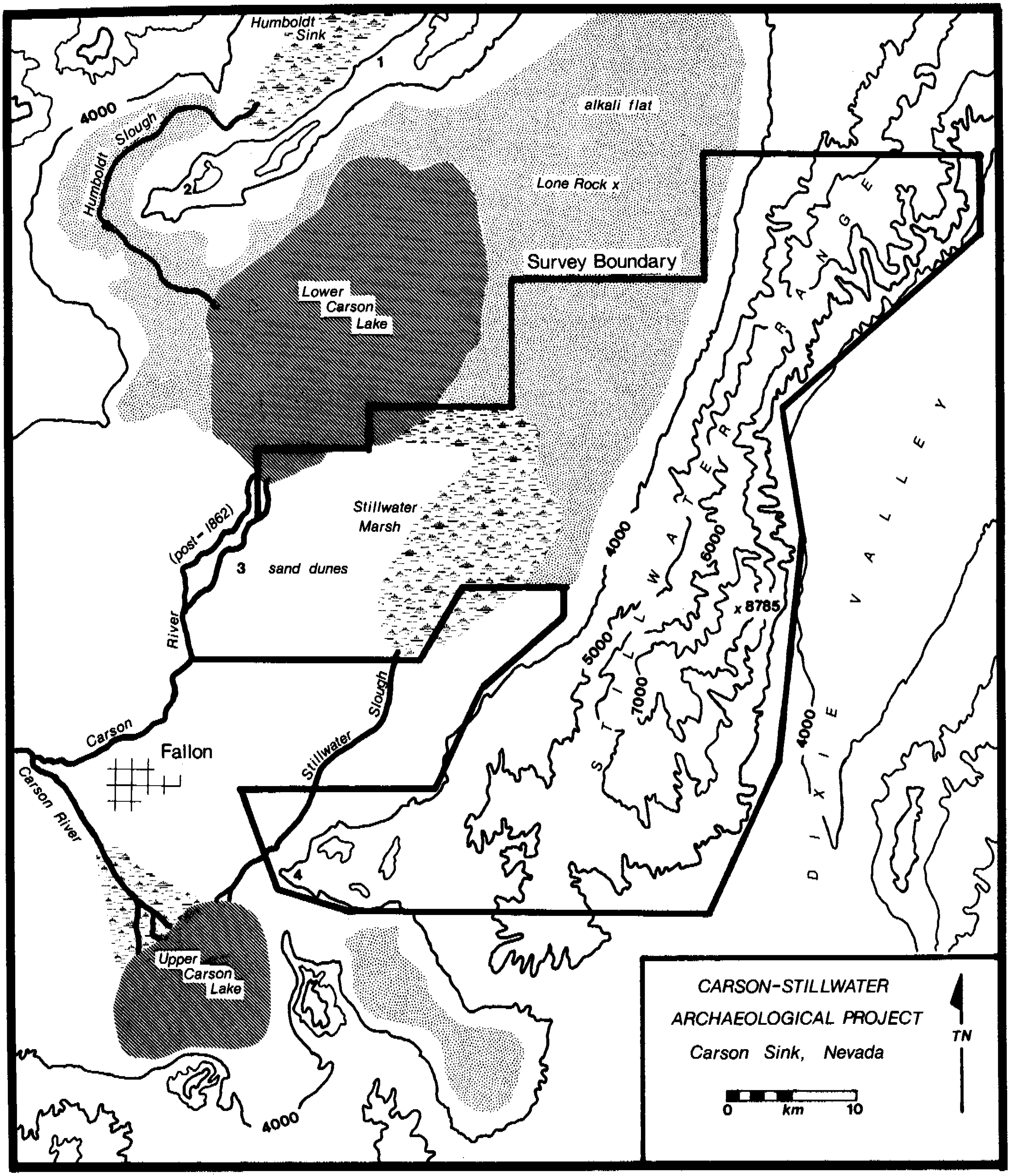
construction of a single theoretical framework capable of explaining, for example, why pithouses are associated with marsh exploitation along the Sevier River in Utah (from 600 A.D. until 1200 A.D.), while pithouses were, apparently, never used in the Carson or Humboldt Sinks. The important question here is whether or not there are differences in the way in which resources fluctuated over short periods of time between these two areas which can account for the different archaeological records.

Fieldwork

Fieldwork for the survey was conducted in an area of about 1600 km^2 encompassing the eastern Carson Sink, which historically contained two lakes and an extensive marsh, and the adjacent Stillwater Mountains, the nearest source of large fauna and pinyon nuts (see fig. 2). In 1980, the objective of the survey was to obtain a one percent sample of the entire region; the results of this survey provided the basis for the 1981 intensive survey. As a result, different areas of the survey region were sampled at different intensities (see Thomas and Kelly 1981). Altogether, the valley floor was sampled with 16, 100 meter wide transects (total of 257 kms.); the mountains were sampled with 57, 500 by 500 meter quadrats. Altogether, 161 sites were recorded and collected, 100 on the valley floor, 61 in the mountains.

EXAMINATION OF AMATEUR COLLECTIONS

The final two weeks of September, 1982 were spent in examining and recording, in part, the collections held by several collectors and museums. Altogether, five major collections were examined. These collections are located in personal homes in Reno and Fallon, and in the Churchill



2. Map of the Carson Sink showing the survey boundary and important archaeological sites and locations in the vicinity: 1-Lovelock Cave, 2-Humboldt Cave, 3-Indian Lakes area, 4-Hidden Cave/Grimes Point. Location of marshes and lakes based on historical documents.

County Museum and the Nevada State Museum.

There are several problems involved in acquiring information from collections made by amateurs. With the exception of the collections in the Nevada State Museum, where material from sites 26Ch16 and 26Ch19 were recorded, there is almost no provenience data on the materials except that the artifacts were found in the Carson Sink. Any comments made about or information derived from the collections, therefore, can only be relevant insofar as they characterize the Carson Sink as a region. Many of the artifacts which collectors lend or donate to museums are the best finds: the large, complete projectile points, or the rare artifact type, and thus are not necessarily representative of an area. In addition, those collectors who mount their artifacts also display only the nicest finds. In order to determine the extent to which sites have been collected, the specific classes of artifacts which have been systematically removed from the sites in the Carson Sink, it is necessary to see the collected artifacts which have been relegated to "shoebox status" -- those artifacts considered to be too badly damaged or commonplace to be hung over the fireplace or donated to museums -- but not too broken or common to have been collected (eg. plate R). Therefore, I examined museum collections and amateur collections in order to discover what artifacts are distinctive or characteristic of the Carson Sink as a region and to discover which artifact classes had been systematically removed from the sites on the valley floor. The latter piece of information is critical to the analysis of the archaeological materials collected as part of the CSAP survey.

Period of Occupation

In a cultural resources overview of the Carson and

Humboldt Sinks, Busby and Kobori (in Bard, Busby and Findlay 1981: 196) noted that materials indicative of all periods of occupation of the Great Basin are represented in the amateurs' collections, including the Western Pluvial Lakes Tradition (paleoindian). I also found several, though not many, concave base points (similar to the Triple-T concave base points described by Thomas [1981]) and crescents in the collections. Whenever I encountered one of these artifacts in a collection I asked the owner if the object had been found in the Carson Sink, and, in every case the answer was an emphatic no, often followed by the comment "you never finds things like that around here, maybe down at Tonopah, or up on the Black Rock, but not here." This information is in agreement with the collection of projectile points made during the CSAP survey: not a single point in the survey collection can be attributed to a paleoindian occupation; nor did we find any crescents, or large "horsehoof" scrapers. The lack of such artifacts may be attributed to geomorphology; stemmed, Haskett-style projectile points are found along the western margin of the Carson Sink (at the Sadmat Site, and north of the town of Hazen) where there is a more developed desert pavement than along the eastern Carson Sink, where the bajada of the Stillwaters is still quite active.

Site Disturbance

The predominant artifact types removed from the sites on the Carson Sink are whole, or nearly whole groundstone (see pl. Cc), whole projectile points, and whole, or nearly whole bifaces (pl. L). There were dozens of mortars and pestles, manos and metates in the collections (see table 1), yet the CSAP survey recovered only one whole pestle, no whole, nor even large fragments of mortars, a few manos and three metates. In addition, the younger collectors in the area do not have much groundstone in their collections (especially mortars and pestles), suggesting that most, if not all such artifacts have been completely removed from the valley floor. The collectors indicated that most mortars and pestles were recovered from the southern Carson Sink, but that some were also found on the alkali flat north of the town of Fallon. Perhaps the increased plowing of land for alfalfa around Fallon has led to the discovery of (and need to remove) these large items. (Indeed, the resident of Fallon with the largest collection of groundstone is not only one of the oldest residents, but helped dig many of the areas first large irrigation ditches.)

The largest collection of bifaces was in a single collection belonging to a resident of Fallon. Of the nearly 5000 items on display at the collector's home, nearly 10% are large (i.e. more than 10 cm. long) bifaces, the remainder being projectile points. No other collector had anywhere near this amount of bifaces; whether or not those located in this collection were found in sites or as burial goods will never be known. Since these bifaces were all mounted frames, on the collector's dining room walls, I was unable to collect metric data from them.

This collector is quick to point out that he only picked up whole projectile points, as did many of the other collectors. It seems that in the past (50 or more years ago) there were so many projectile points on the valley floor, and so many new ones exposed after every rain and windstorm that collectors did not bother with picking up broken points, or point fragments. Although it is only my impression, it would appear that much fewer of the broken points have been picked up compared to the whole points. This is an important piece of information. The primary means of dating surface sites in the Great Basin is through the presence of temporally sensitive artifact types -- in this case, projectile points -- on those sites. While it is more difficult to assign projectile point fragments to various temporal types, it is not impossible; thus, the frequency of projectile point fragments on sites may be used as an indication of the period(s) of time during which the site was deposited.

Burials

There have been several burials found in the Carson Sink, in both caves (Tuohy and Stein 1969; Wheeler and Wheeler 1969) and on the open valley floor (Hardesty 1969). In addition, a Fish and Wildlife employee told me that he had once seen 27 burials near Swan Lake, and one other near Papoose Lake (both part of the Indian Lakes in the western part of the Sink -- see fig. 2). All of these burials were lying on their sides, and flexed; there were no grave goods associated with any of the burials (all of which were discovered many years ago and have long since disappeared). Local residents also remember the discovery of about two dozen skeletons near Battleground, a point of land (actually a large dune) protruding into the alakli flat, located north of the Indian Lakes area. I was told that shell beads are often a good indicator of the presence of a burial. Many people had such beads in their collections, and I assume that there have been many other burials found which have gone unreported.

The presence of burials in the Carson Sink, along with the presence of bone tools in the amateur collections (see pls. M and N) indicate that the soil of the Sink is sufficiently alkaline to allow for the preservation of bone in archaeological sites. This is important for a particular reason. Several of the sites located during the CSAP survey were found to contain, in addition to lithic materials, scattered distributions of small pieces of bone. These scatters of fragmented, often burned bone were not found in all sites on the valley floor, but were never found not in association with other archaeological debris, such as chippage and fire-cracked rock. Our analysis of this bone sample is not complete, but most of the bone appears to be that of fish, waterfowl, and shore birds, and not that of larger mammals. The fact that human remains and bone tools are preserved in the soil suggests that the faunal remains recovered by CSAP have some archaeological significance.

Finally, I was informed that, with the exception of a few minor finds (eg. pl. I) by ranchers and cowboys, there has been little collecting done in the Stillwater Mountains. We can probably safely assume that all sites recovered there during the CSAP survey are intact and the collections made from these sites indicative of the sites' original contents.

DISTINCTIVE ARTIFACTS

One objective in examining the amateurs' collections was to record those items under-represented in the survey's collections. One class of items, groundstone effigies (see pls. A, C, D) was completely unrepresented in the CSAP survey. Donald Tuohy of the Nevada State Museum is preparing an indepth report on the effigies of western Nevada, and I will not discuss this artifact type here.

Other artifacts under-represented in the survey collections, but found in amateurs' collections included "sickles" (pl. E -- these were the only instances of this type of artifact which I saw), "discoidals" (pl. J), and stone pipes (pl. B). In plate I is shown part of the contents of a cache found at the mouth of a canyon along the western margin of the Stillwater Mountains. Five manos and a "double handful" of white chert and obsidian chippage was also found in this cache. A few collectors had some shell artifacts in their possesion including a small amount of dentalium (pl. F), abalone (pl. O), and copious Olivella beads (pl. P). All of these artifacts are indicative of some type of exchange mechanism between the Carson Sink, California and the Northwest Coast.

In addition, one collector had many "eccentrics" fashioned from obsidian -- small, often intricately flaked items with no apparent functional purpose. Those shown in plate H were nearly all that I saw. There was also evidence of bone bead manufacture (pl. N) and possibly lapidary work as well. The artifacts shown in plate G may be a type of stone drill (of which I saw a total of only about a dozen, which all belong to a single collector). All the items in plate G are made from fine-grained basalt, and have a groove on one side of the tip, running longitudinally which cuts across a slight ridge encircling the tip, about 1-2 cm. from the end. These may have been used with a bow to produce the drilling action, the groove allowing one to work wet sand down into the drilled hole to act as an abrasive. There is, however, no definite proof to support this interpretation.

GROUNDSTONE

Five different types of groundstone artifacts were encountered in the collections: mortars (pls. Ee, Ff), pestles (pls. Dd, Gg, Hh), metates (pl. Ii), manos (pls. Kk, Ll) and effigies (see above). Counts of different types of groundstone were tabulated at two locations, one amateur collection and the Churchill County Museum. Unfortunately, there is little provenience information for these items; many of those housed at the Churchill County Museum may not have been found in the Carson Sink (there was little provenience data available when the collection was donated to the museum). However, the information on groundstone items presented in tables 1 - 5 was gathered from pieces which I am fairly certain came from the Carson Sink.

Manos and Metates

The manos and metates found in the Carson Sink can be divided into two types: those associated with a rotary grinding motion and those associated with a back-and-forth grinding motion. Rotary motion metates are slightly concave, with a dish-like surface; the associated manos tend to be rounded and smaller, as if they were only held in one hand when in use (pl. Kk). Back-and-forth motion metates (pl. Ii) have a less concave grinding surface, which is oriented along the stone's long axis. The associated manos were held in both hands when in use and tend to be more rectangular (pl. Ll). (for ethnographic data associating particular forms of manos and metates, see Driver and Massey [1957: 241]).

Among the Walapai of northwestern Arizona, Kroeber (1935) found that rotary motion metates were used for

TABLE 1

GROUNDSTONE COUNT FREQUENCIES

Groundstone Type	Count	%	Combined %
Metates	192	32.6	
Manos	182	30.9	63.5
Mortars	40	6.8	
Pestles	174	29.5	36.3
Totals	588	99.8	99.8

grinding small seeds, while larger seeds were ground on back-and-forth metates. It is possible, however, that it is not the size of the seed which matters, but whether the seed is being ground into flour or not. The back-and-forth motion allows one to grind seeds into a powder which can be continually shunted off into a basket or container (eg. see Wheat 1967). This is why, for example, back-and-forth motion metates were used in conjunction with mealing bins in the American Southwest. It is interesting that both types of metates are found in equal frequencies in the Carson Sink (see table 2) as it is my impression that the rotary motion metate is much less common in other areas of the western and central Great Basin.

Mortars and Pestles

The most intriguing aspect of the Carson Sink groundstone assemblage is the high frequency of mortars and pestles. A survey of the archaeological and ethnographic information on the Great Basin indicates that large mortars and pestles occur only in areas of lakes and/or marshes. Many of the mortars found elsewhere in the Basin are very small; ethnographic data suggests such items were used for

TABLE 2

METATE DATA

Item	Length	Width	Thick.	Material	Comments
Metate	68	25	3.5	granite	back-and-forth motion
Metate	48	33	15	basalt	rotary motion
Metate	41	23	6	basalt	back-and-forth motion
Metate	55	41	4	basalt	rotary, heavily worn
Metate/ mortar	39	16		basalt	rotary, round metate with mortar in center
Metate	42	8	9	rhyolite	rotary?
Metate	50	36	11	conglomerate	rotary?
Metate/ mortar	62	40	25	basalt	bowl-like, rotary motion with mortar depression
Metate	45	27	9	basalt	back-and-forth motion
Metate	46	33	3	rhyolite	rotary, platter
Metate	43	30	3	basalt	rotary motion
Metate	46	34	4	basalt	back-and-forth, platter
Metate	41	32	7	rhyolite	back-and-forth, shaped
Metate	20	19	3		back-and-forth, recycled
Metate	37	25	4	rhyolite	back-and-forth motion
Metate	51	29	6	basalt	back-and-forth motion
Metate	49	32	6	basalt	rotary, well-shaped
Metate	41	25	4	quartzite	back-and-forth motion
Metate	52	31	9	rhyolite	rotary, deep, bowl-like
Metate	42	27	17		expedient milling slick

Note: measurements from specimens in the Churchill County Museum. All measurements in cms.

grinding material to manufacture paints, or to crush small animals or dried meat into a mush for the elderly or toothless to eat (Kroeber 1925: 327, 448), or were carried while traveling (Loud and Harrington 1929: 142).

The mortars and pestles of concern here, however, are much larger (see table 3 and pl. Cc) and, in the Carson Sink have been moved considerable distances from their possible sources (see Powers[1877: 377] for a similar distribution around Tulare Lake in California, and Steward[1938: 80] for a similar distribution in Eureka Valley). The mortars and pestles in the Carson Sink are fashioned, for the most part, from a dense basalt and must have required considerable effort for their manufacture. Their manufacturing costs and distribution, combined with the fact that they co-occur with manos and metates suggest that the difference between mortars and metates is more than a stylistic difference.

A closer examination of the use of mortars and pestles may indicate something about the way in which lacustrine or marsh resources were used prehistorically in the Great Basin.

Unfortunately, there is little ethnographic data on the use of mortars and pestles. While they are present in archaeological contexts throughout California, informants either denied their use, or claimed the items were used only if one stumbled upon one in the sand. The Surprise Valley Paiute, for example, made some use of mortars, which they encountered in archaeological sites, but attributed their manufacture to a previous race of cannibals (see Kelly 1932: 136). Although Powers(1877) claimed that mortars were used in grinding acorns, Kroeber's(1925) later ethnographic survey of Californian aboriginal groups indicated that few groups were using mortars with the exception of the Konomihu, who used wooden mortars (Kroeber 1925:284). Most Californian groups of hunter-gatherers made use of a basket hopper with a dish-shaped metate for pounding acorns and

TABLE 3

MORTAR DATA

Item	Height	Inside Depth	Outside Diameter	Inside Diameter	Comments
Mortar	44	23	44	30	shaped
Mortar	52	27	37	33	shaped
Mortar	39	28	38	25	shaped
Mortar	34	25	30	22	shaped
Mortar					fragment
Mortar	14		20		slight depression
Mortar	32	16	40	18	not shaped
Mortar	29	24	38	25	shaped
Mortar	35	27	38	25	shaped
Mortar	50				not shaped
Mortar					fragment
Mortar	59	16	48	41	shaped
Mortar	25	17	32	19	not shaped
Mortar	22	16	19	14	shaped
Mortar	20	10	38	17	not shaped

Note: measurements from specimens in the Churchill County Museum. Measurements in cms. All items are fashioned from basalt.

TABLE 4

MANO DATA

Item	Length	Width	Thick.	Material	Comments
Mano	15	8	3.5	basalt	shaped, worn
Mano	13	10	3.5	basalt	shaped, worn
Mano	18	7	4.5	basalt	unshaped, worn
Mano	10	10	2.0	rhyolite	
Mano	14	12	2.5		shaped, worn
Mano/ Hammerstone	16	9	6.0	quartzite	unshaped, worn
Mano	16	11	2.0		shaped, worn
Mano	12	10	4.0	basalt	unshaped
Mano	15	10	2.0	basalt	unshaped, worn
Mano	14	10	8.0	granite	unshaped
Mano	12	9	3.0	basalt	shaped
Mano	13	9	4.0	granite	shaped
Mano	17	7	6.0	granite	shaped
Mano	14	8	4.5	rhyolite	shaped, worn
Mano	11	9	2.5	quartzite	shaped, worn
Mano	16	8	6.0	basalt	shaped
Mano	18	8	4.5	basalt	unshaped
Mano	15	9	5.0	quartzite	shaped
Mano	10	9	3.0	basalt	shaped

Note: measurements from specimens in the Churchill County Museum. Measurements in cms.

TABLE 5

PESTLE DATA

Item	Length	Diameter	Comments
Pestle	27	13	shaped,depression on one side
Pestle	28	10	shaped,depression on one side
Pestle	48	12	shaped
Pestle	54	14	shaped
Pestle	33	9	shaped
Pestle	24	8	unshaped
Pestle	35	12	shaped
Pestle	37	13	shaped
Pestle	29	13	shaped
Pestle	36	11	shaped
Pestle	15	7	unshaped
Pestle	33	12	shaped
Pestle	23	8	unshaped
Pestle	24	13	shaped
Pestle	32	10	shaped
Pestle	38	11	shaped
Pestle	28	10	unshaped
Pestle	27	12	shaped
Pestle	29	12	shaped
Pestle	33	12	unshaped
Pestle	43	11	shaped
Pestle	19	9	shaped,"waisted"
Pestle	45	13	shaped
Pestle			unshaped
Pestle	28	11	shaped
Pestle	40	9	unshaped
Pestle	36	13	shaped
Pestle	28	12	shaped

Note: measurements from specimens in the Churchill County Museum; all measurements in cms. All items are fashioned from basalt.

roots; this basket hopper, which is open at both ends, acted like a mortar:

> The northern Californians do not use mortars. They pound acorns and seeds on a flat slab on which the hopper is loosely set. It will be seen that this northern method of pulverizing food makes the hopper indispensible. Without it the particles would scatter widely (Kroeber 1922: 158)

Gathering information from a local (Lovelock) Paiute Indian, Loud and Harrington (1929: 142) wrote:

> As regards the use of large mortars, Natches said that after cattail seeds had been gathered and the "wool" burnt from them ... they were placed in a big mortar "two feet high" and the largest sized pestles used in cracking the shells. Then the seeds were again subjected to heat and the shell separated, after which the meal was ground fine on a metate. A band of people, men, women, and children could produce four or five sacks of meal by a day's strenuous labor.

Elsewhere in North America mortars have been used in grinding dry mesquite and various plant roots (see Driver and Massey 1957: 179, 211). In Australia (more specifically, Arnhem Land), mortars and pestles were used to crack nuts, pulp fruit or soften cooked roots; metates, however, were used to grind nuts into flour (Peterson 1968). The mortar was also used in breaking open long bones and skulls of animals, pulping pieces of cooked lizard, fish and kangaroo tail so that the bones could be ingested and no meat wasted. Among the aborigines Peterson found that mortars and pestles, manos and metates were often left in camps, and rarely transported about (except to scavenge them from campsites). One of Peterson's more interesting observations was that there were fewer mortar and pestles in the interior where there was heavier reliance upon grass seeds, than along the coast, where roots, which need to be thoroughly pounded for their exploitation, were a primary source of nutrition.

From the southeastern United States, Driver and Massey (1957: 211) provide an account of the preparation of the roots of Smilax and Zamia:

> The roots of both were pounded in a wooden mortar with a wooden pestle. Later, water was added and the mixture stirred until the flour became suspended in the water, and the liquid was poured

> off into another vessel. After the flour had settled to the bottom, the water was poured off, and after evaporating the remaining moisture in the sun, dry flour resulted.

Aborigines of the eastern and southeastern United States also made use of large wooden mortars for the grinding of corn (Swanton 1946: 558-60). These references indicate that mortars were used when a pounding force was needed to process a foodstuff, rather than a pressing force, such as that used to grind nuts or seeds into flour. This also indicates that mortars will always be associated with the use of foods which require more effort for their processing. These same foods may also be high in carbohydrates and starch, but low in protein (as is the case with acorns, and many root crops such as *Zamia*, *Smilax*, *Typha*, and *Scirpus*). Mortars may also be employed when the material is to be mashed into a semi-liquid mush, for example, when processing whole rabbits, rodents, or lizards for consumption.

We should question why a group of hunter-gatherers would elect to use a stone mortar, which may be difficult to transport, rather than a wooden one, or one fashioned from a metate and a basket hopper, both of which are easier to manufacture and transport.

It might be assumed that the presence of a large piece of groundstone would be indicative of a sedentary population; the stone's portability would not be an important factor under such conditions, and its continued use by a group or family might justify the initial cost of acquiring, moving, and shaping the stone. This does not explain, however, why several southern Californian groups, such as those living along the San Joaquin delta, began using wooden mortars as they (apparently) became more sedentary (see Heizer and Treganza 1944) when they had previously been using stone mortars (which had been transported a considerable distance, and some of which weighed in excess of 125 pounds). Nor can this explain why corn agriculturalists of the southeastern United States use wooden mortars, or why the Australian aborigines of Arnhem Land use stone mortars and yet are residentially mobile.

On the other hand, the presence of large groundstone tools might be indicative of a mobile population, who needed use of the stone implements infrequently and who used them only for particular resources. Peterson notes that Australian aborigines left metates and mortars at sites, remembering where the tools were located, rather than carrying them along. If the resources exploited in a marsh or lake require a special, pounding technology, and if those resources are used infrequently, as I suggested above, then it might make sense to invest energy in the manufacture and transport of an item which can complete the task and yet be left at a site with the knowledge that the tool will be there in the future. (A wooden mortar obviously would not last.) Thus, like many of the cave sites around marshes and lakes in the western Great Basin (such as Lovelock Cave), the groundstone on the valley floors may also be the result of a caching strategy. It is interesting in this regard that several collectors told me that most of the mortars which they had found had been left upside down in the sand, which they assumed was to keep water from freezing in the depression and cracking the implement (as they had discovered was possible from personal experience). This observation suggests that the mortars of the Carson Sink were left behind with the intention of using them again, some time in the future.

Unfortunately, we have no way of ascertaining during what period(s) of time the mortars and pestles were in use. None is found in the many caves and rockshelters which have been excavated, and none has been recovered in datable contexts in surface sites. The only conclusion we can draw at the moment is that these stone implements were not used extensively during the late prehistoric period in the Great Basin, judging by the lack of their mention by ethnographers and explorers.

PROJECTILE POINT ANALYSIS

One of the objectives of examining the amateur and museum collections was to gather data which could be used in a test of the efficacy of the projectile point typology proposed by Thomas (1981). Thomas has suggested that the typology should be accurate for the western Great Basin, though it was created to describe the temporal variability in projectile points from Monitor Valley, in central Nevada (see fig. 1). In a sense, it is impossible to test Thomas' typology with the data presented here, since it is concerned with temporal types, and since there is no independent temporal control (such as radiocarbon dates) associated with the projectile points in the amateurs' collections. Twenty-four points, collected during the CSAP survey, however, have been submitted to Mr. Richard Hughes, of the University of California to be sourced. If the sourcing data allow, these points will then be cut and examined for hydration rinds by Mr. Robert Jackson, also of the University of California. The hydration data may only provide relative age estimates, since the precise hydration curves are poorly understood and since surface material will often hydrate differently from the subsurface material upon which the available curves are based. Thus, while these potential hydration dates are not especially promising, they are at the moment the only chance of obtaining independent dates on the Carson Sink surface projectile points. (Research being conducted with the Hidden Cave materials may provide a test of the temporal span of Gatecliff series points in the Carson Sink.)

Attributes relevant to Thomas' projectile point key were measured on 356 projectile points from the collections; in addition, data on material type, heat-treating, recycling and technology (bifacially versus unifacially flaked) was recorded (see Appendix for projectile point data). In anticipation that Thomas' typology would be applicable to the projectile points from the Carson Sink, 736 other points were typed using Thomas' key (see table 6); the points typed in this fashion were mounted in frames and did not allow that some variables be taken into consideration (eg. thickness) when typing the points. Amateurs often make frames of similarly-shaped points; measuring the points in such frames would bias a sample of the collections. Frames were chosen which seemed to have a variety of point types represented, or frames from smaller collections, represented nearly all the points which the collector owned (and lessening the degree to which a collector could have picked and chosen which points to place in a frame). With Thomas' key in hand, all but 99 (13%) of the 736 points could be typed. Similarly, of the 356 points measured, only 15 (4%) could not be typed (see table 7).

TABLE 6

PROJECTILE POINT FREQUENCY BY TYPE
(no metric data available)

Type	Number	% of total	% of typable
Desert Side Notch	137	18.6	21.5
Cottonwood Tri./ Cottonwood Leaf-Shape	41	5.5	6.4
Rosegate series	240	32.6	37.6
Elko series	112	15.2	17.5
Gatecliff Split Stem	9	1.2	1.4
Gatecliff Contracting Stem	5	.6	.7
Humboldt	86	11.6	13.5
Large Side Notch	1	.1	.1
Carson	6	.8	.9
Untyped	99	13.4	
Total	736	99.6	99.6

TABLE 7

PROJECTILE POINT FREQUENCY BY TYPE
(metric data available)

Type	Am.Coll. No.	26Ch16 No.	25Ch19 No.	Total
Desert Side Notch	18	58	2	78
Cottonwood Triangular	4	35	1	40
Cottonwood Leaf-Shape	6	1	0	7
Total	28	94	3	105
Rosegate series	72	2	2	76
Elko Corner-Notch	33	1	2	36
Elko Eared	12	2	3	17
Total	45	3	5	53
Gatecliff Split Stem	15	0	1	16
Gatecliff Contracting Stem	11	1	0	12
Total	26	1	1	28
Large Side Notch	5	2	0	7
Humboldt	41	0	0	41
Carson	9	1	1	11
Unknown	6	6	3	15
Total	61	9	4	74
Total	232	109	15	356

Note: metric data on these points is listed in the Appendix.

Projectile Point Statistical Analysis

Since Thomas' typology appears to "work" on the Carson Sink projectile points, it would be useful to test the typology by demonstrating that clusters of particular attbutes and particular values of those attributes exist which are similar to those defined by the Monitor Valley projectile point key. The statistical analysis described here has scarely begun, and will be continued in more detail later.

As a first step, a correlation matrix was generated to check for variable redundancy (see table 8) which indicated that the variables of weight, total length, and axial length are all highly correlated (as might be expected); in addition, medial length correlates with the maximum width position, and DSA with PSA. Based on these results, measures of length, neck width, and DSA were not used in further analysis.

As a second step, six variables were selected to use in a K-means analysis of the projectile points: basal width, PSA, Weight, Basal indentation ratio, maximum width position, and the basal width to maximum width ratio. K-means analysis is a non-hierarchial divisive cluster routine which attempts to maximize the degree of inter-cluster differences while minimizing the degree of intra-cluster variance (see Kintigh 1982; Kintigh and Ammerman 1982). Metric data on 249 of the 356 measured points was submitted to the K-means analysis.

The analysis indicated that the "best fit" is found at four clusters; the composition of these four clusters in terms of projectile point types is shown in table 9. It is apparent from this table that particular projectile point types are the primary constituents of different clusters. Cluster 1 is comprised primarily of Rosegate points; cluster 2 of Desert Side Notch points; cluster 3 of Cottonwood

TABLE 8

CORRELATION MATRIX OF PROJECTILE POINT ATTRIBUTES

Variable	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.	K.	L.	M.	N.
A. Lt	1.00													
B. La	.98	1.00												
C. Lm	.49	.52	1.00											
D. Wm	.56	.57	.22	1.00										
E. Wb	.32	.25	-.14	.48	1.00									
F. Th	.41	.40	.40	.41	.30	1.00								
G. NW	.14	.13	-.15	.58	.41	.10	1.00							
H. NO	-.11	-.11	-.11	.08	-.09	.04	.59	1.00						
I. DSA	-.25	-.26	-.37	.06	.08	-.17	.75	.74	1.00					
J. PSA	-.26	-.28	-.43	.09	.19	-.22	.72	.50	.89	1.00				
K. Wt	.81	.79	.46	.66	.43	.46	.28	.00	-.13	-.15	1.00			
L. BIR	.06	.21	.25	.12	-.39	.04	-.04	.01	-.10	-.15	.04	1.00		
M. MWP	.14	.18	.88	.04	-.32	.29	-.18	.00	-.29	-.37	.17	.29	1.00	
N. WbWm	-.19	-.26	-.43	-.39	.58	-.11	-.09	-.18	.04	.15	-.16	-.54	-.47	1.00

Note: N=210, see Appendix for variable abbreviations.

Triangular and Humboldt points; and cluster 4, of large corner-notch points (Elko and Gatecliff series). One potential source of error here is the different sample sizes of different point types; it is difficult to say, for example, upon which cluster Cottonwood Leaf-Shape and Large Side Notch points load.

Gatecliff Contracting Stem points may be associated with Rosegate points in this analysis rather than with the other corner notched points as in many cases the sole factor discriminating between contracting stem and Rosegate points is the degree of stem contraction, a factor taken into consideration by Thomas (1981), but not by the variables applied to the K-means analysis here.

Humboldt points appear to be associated with cluster 1 and 4, as well as 3, and not with cluster 2 because of the similarity in weight between Rosegate, Humboldt and large corner-notch projectile points (due to the wide size range of Humboldt points).

The K-means analysis indicated that the most important discriminating variables among the different clusters are PSA and basal width. The four clusters have, in effect, defined the four major series level groupings indentified in Thomas' typology: unnotched, unstemmed points (cluster 3), small side-notch points (cluster 2), small corner-notch points (cluster 1) and large corner-notch (or straight base) points (cluster 4). This analysis would appear to justify the applicability of Thomas' typology to the Carson Sink material, at least as far as the series level.

There are some minor differences, however, between the Monitor Valley and Carson Sink projectile points. For example, Thomas establishes cutoff points of 30 mm (length) and 4 mm (thickness) for the Cottonwood Triangular and Leaf-Shape points from Monitor Valley, yet many of the points in the Carson Sink sample which fulfill other characteristics of Cottonwood Triangular or Leaf-Shape points are longer

TABLE 9

K-MEANS ANALYSIS CLUSTER COMPOSITION
BY PROJECTILE POINT TYPE

Cluster	Projectile Point Cluster Composition, by Type (%)											
	DSN	CLS	CTT	RSG	HUM	LSN	ECN	EEE	GSS	GCS	CAR	UNK
1	0	2	0	48	14	2	12	1	4	7	8	2
2	76	0	0	2	0	2	7	3	2	0	3	5
3	0	9	36	3	51	0	0	0	0	0	0	0
4	0	0	0	3	15	8	26	18	26	3	0	3

than 30 mm and/or thicker than 4 mm. Thomas also suggests that Humboldt points are more than 30 mm in length and more than 4 mm in thickness, yet there are points in the CSAP sample which are shorter and/or thicker. In addition, many of the concave base points in the sample had maximum widths equivalent to the basal width. Similar points have been found elsewhere in the Carson Sink area (see Heizer and Clewlow 1968) and are found at Horizon 4 at Gatecliff (Thomas 1981). These findings are not out of line with Thomas' conclusion that the size range of Humboldt is poorly defined.

The purpose in making the above comments is not to indicate fallacies or shortcomings in Thomas typology, but to document the sort of variability which needs to be accounted for in a typology of Great Basin projectile points.

Carson Projectile Points

One of the more interesting finds of both the CSAP survey and an examination of amateurs' collections is a number of extremely small points, which I have temporarily labeled Carson projectile points (see pls. Aa, Bb). In table 10, I have presented summations of some of the data collected on the points measured in the amateurs' and the CSAP collections. While most of these points fall into the typological category of Rosegate, there is a significant difference between the amateur collection sample of Rosegate and Carson projectile point weights ($t=4.56$, $df=73$, $p<.001$).

The CSAP survey located these points only at a single site, 4386-13 (26Ch794), where over sixty points were collected, most of these being complete specimens. Without prompting, two of the collectors indicated that they rarely found these tiny points, but whenever they found one, they knew they were sure to find dozens. These points may have been used differently from other projectile points which occur in both sites <u>and</u> as isolates over much of the Carson Sink floor.

Unfortunately, we have no way of dating these points at the moment. At Rye Patch, north of the Carson Sink, Mary Rusco has found several small projectile points in Rosegate context (i.e. 700 A.D. to 1300 A.D.), but, as the data in table 10 indicate, the points recovered at Rye Patch may be significantly different from those recovered from the Carson Sink (which is why I hesitate in calling the Carson Sink material by Rusco's appelation "Rye Patch Miniatures"). Five of the CSAP obsidian specimens have been submitted for sourcing and, if possible, hydration dates. Unfortunately, the points are windblasted and the hydration rind may be obscured or eroded.

To my knowledge there are few occurrences of these small points in the western Great Basin; certainly they have not been reported in the number in which they occur in the Carson Sink. Besides those found at Rye Patch, Tuohy reports several small points (Tuohy 1963: pl. 22d; 23cc; 24i -- a total of four specimens) with an average length of 1.23 cm., width of .59 cm. and thickness of .25 cm. Elsasser (1958) also notes the presence of 33 "small" (<.5 grms. in weight) points at a site in the Humboldt Sink (26Pe05), but provides no other information except that he does not think the site was occupied after 1300 A.D. since there are no Desert Side Notch projectile points present at the site. The same pattern holds for 26Ch16 (see table 7), a predominantly late component site. Thomas (1981) notes that small side notched points are found in Owens Valley (see Thomas 1981: note 5), but we have no information on these points as of now.

The small size of the points coupled with the fact that most are fashioned from obsidian (which is not found locally and must come from a minimum of fifty miles away) may

TABLE 10

CARSON PROJECTILE POINT DATA

Variable	Amateur Collection			CSAP 4386-13			Rye Patch (range)
	$\bar{X}$	S.D.	N	$\bar{X}$	S.D.	N	
Total length	14.0	1.5	11	13.1	2.8	48	18.7-32.0
Max. width	9.3	1.6	11	9.1	2.0	54	
Basal width	5.9	1.6	11	5.1	1.9	54	5.9-12.1
Weight	0.4	0.07	11	0.22	0.14	51	0.3-1.9
PSA	111.8	25.0	11	105.0	20.0	53	
Thickness	2.9	0.88	11	2.8	1.0	55	2.1-6.6

Note: linear measurements in mm., wt. in grms., PSA in degrees.

indicate that these points are the result of extreme lithic conservation and/or scavenging, since there is no stone material naturally available on the valley floor (which is knappable), and since obsidian is one of the few types of stones which are potentially knappable at very small scales. This does not, however, explain the points' "clumped" spatial distribution. A more detailed report on these points is currently being written.

PROJECTILE POINT NON-METRIC DATA

Compiled data on heat-treating, technology, recycling and material type are presented in tables 11-14.

Heat-Treatment

Heat-treatment is a procedure whereby siliceous stone materials can be made more "plastic" and thus increase their knapping potential. Stone material is heat-treated by placing it in a pit, covering it with wet sand and keeping a fire burning over the spot for 24 hours or longer. Heat-treated nodules develop a particular sheen to their interior, and takes on a waxy feel. If material is over-heated, the surface of the stone will become crazed, and eventually crack. Dense siliceous stones such as cherts and jaspers are more often heat-treated than glassy material such as obsidian, or more irregular material such as rhyolite. Unfortunately, the part of the nodule bearing evidence of heat-treatment is often removed as the stone is flaked; consequently, the data in table 11 may be misleading, and it is difficult to draw conclusions from these data. An examination of the chippage which results from tool production would be more indicative of the extent to which heat-treatment was an important aspect of the technology at different periods and/or at different locations in the past. This problem will be pursued in the analysis of the chippage collected from sites during the CSAP survey.

Technology

It is equally difficult to draw conclusions concerning the differences in knapping technology of the different point types. The highest frequency of unifacial points in the sample is found among post-1300 A.D. point types (about

TABLE 11

SUMMARY OF DATA ON PROJECTILE POINT HEAT-TREATMENT

Projectile Point Type	Heat Treated	Not Heat-Treated	Unknown
Desert Side Notch	2	73	3
Cottonwood Triangular	0	40	0
Cottonwood Leaf-Shape	0	7	0
Rosegate	6	70	0
Elko Corner Notch	2	34	0
Elko Eared	2	14	1
Gatecliff Split Stem	2	14	0
Gatecliff Contracting Stem	1	11	0
Humboldt	1	38	2
Large Side Notch	0	7	0
Carson	1	10	0
Unknown	1	14	0

28%). It is interesting that there is a nearly identical frequency of unifacial points in the Gatecliff Series points (about 21%). Ignoring the issue of sample size for the time being, these data may suggest that it is not simply projectile point size which conditions whether or not it is feasible to make a point from a flake so thin that it cannot be worked down bifacially. While this may be the case for small Desert Side Notch and Cottonwood series points, the higher frequency of unifacial Gatecliff series points compared to later Elko and Rosegate series points may be indicative of differences in the hunting strategies between these time periods. For example, if hunting were done through long distance logistical mobility, rather than by short daily forays from a residential location (see Binford 1980), during the period of time in which Gatecliff Series points were used there may have existed more occasions when points had to be fashioned from whatever raw material was available locally, or from what material had been carried with the hunters. That is, long-distance logistical hunting may be associated with a greater frequency of instances in which expedient gear would had to have been produced, and the consequent production of unifacial points from flakes or nodules too small to have been worked bifacially.

TABLE 12

SUMMARY OF DATA ON TECHNOLOGY
OF PROJECTILE POINT PRODUCTION

Projectile Point Type	Bifacially flaked	Unifacially flaked	Unknown
Desert Side Notch	55	21	2
Cottonwood Triangular	27	13	
Cottonwood Leaf-Shape	6	1	
Rosegate	56	12	8
Elko Corner Notch	27	7	
Elko Eared	15	1	1
Gatecliff Split Stem	14	2	
Gatecliff Contracting Stem	8	4	
Humboldt	35	6	
Large Side Notch	6	1	
Carson	8	2	1
Unknown	13	2	

Recycling

The recycling data lend themselves to a similar interpretation. As shown in table 13, there is a continual decrease in the frequency of resharpened points through time (sample size, again, could be an important factor). We might expect to see a decrease in the degree to which a point had to be resharpened with a decrease in the frequency of long-distance logistical hunting expeditions. It could be argued that smaller points, such as Desert Side Notch, once broken are more difficult to resharpen into viable weapons than points which were initially much larger. Thus, the shift in resharpening frequency shown in table 13 may be a reflection of a change in point size only, rather than a change in the use-life of a point. However, the initial size of a point may itself be based upon the degree to which its creator must anticipate recycling the point in the future. Therefore, while recycling frequency and point size may be correlated, both variables may be a function of a shift in hunting patterns and the associated technology.

TABLE 13

SUMMARY OF DATA ON RECYCLING OF
PROJECTILE POINTS

Projectile Point Type	Recycled	Not Recycled	Unknown
Desert Side Notch	14	40	24
Cottonwood Triangular	2	37	1
Cottonwood Leaf-Shape	0	6	1
Rosegate	17	46	13
Elko Corner Notch	16	16	4
Elko Eared	4	10	3
Gatecliff Split Stem	10	4	2
Gatecliff Contracting Stem	6	6	0
Humboldt	3	29	9
Large Side Notch	1	4	2
Carson	0	10	1
Unknown	2	9	4

Bettinger and Baumhoff (1982) have suggested a similar difference in hunting strategies of pre and post-1000

A.D. (approximately) occupations of the Great Basin. They attibute such a difference to the migration of Numic-speaking peoples from southern California who out-competed the previous occupants of the Basin by increasing their niche width and exploiting the resources of a given region more intensively. This required a reduction in the effort placed into long distance hunting. The data presented here would suggest that, at least as far as the hunting pattern is concerned, the shift may have been more gradual than that proposed by Bettinger and Baumhoff.

Lithic Raw Material

There is little which can be concluded from the raw material data presented here. Many of the points in the Carson Sink are fashioned from obsidian, although this may represent collection bias since amateurs tend to collect many more obsidian rather than non-obsidian points due to their own preference and the visibility of obsidian upon the sandy valley floor.

However, the use of obsidian in projectile point manufacture may also indicate the geographic range used at different periods of time. A preliminary analysis of obsidian projectile points and chippage (CSAP sample) from the valley floor indicates that sources to the west and south were used more often than northern sources, suggesting that the Carson Sink may not have been used by groups whose range included, or who had trade connections with the northwestern Great Basin.

TABLE 14

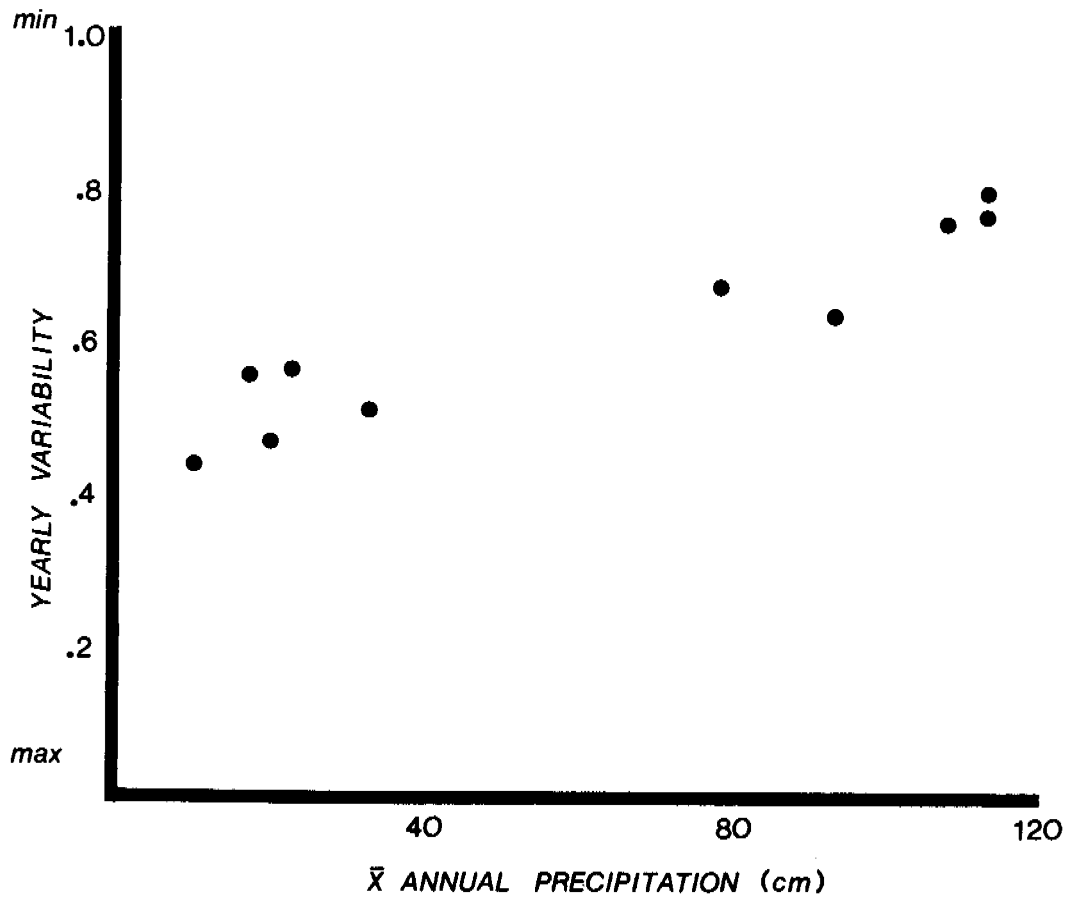
SUMMARY OF DATA ON PROJECTILE POINT
RAW MATERIAL TYPE

Projectile Point Type	Obsidian	High Quality Chert	Average Chert	Quartzite	Basalt	Chalcedony	Other
Desert Side Notch	24	1	45	0	0	8	6
Cottonwood Triangular	10	6	22	1	0	1	0
Cottonwood Leaf-Shape	5	0	2	0	0	0	0
Rosegate	32	10	26	0	2	4	2
Elko Corner Notch	21	3	6	0	4	2	0
Elko Eared	4	1	6	0	4	2	0
Gatecliff Split Stem	7	4	3	0	1	1	0
Gatecliff Contracting Stem	6	2	3	0	1	0	0
Humboldt	29	1	8	0	2	1	0
Large Side Notch	4	0	3	0	0	0	0
Carson	9	1	0	0	0	0	1
Unknown	12	2	2	0	0	0	0

CONCLUDING REMARKS

There is one final aspect of the projectile point assemblage to be discussed. The occurrence of the various point types is listed in tables 6 and 7; these data indicate that Rosegate series projectile points are dominant over Elko series points, despite the fact that Elko Points were used during a period of time twice as long as that during which Rosegate points were apparently used (app. 1500 B.C. to 500 A.D. for Elko, 500 A.D. to 1300 A.D. for Rosegate). Elsewhere in the Great Basin, Elko series projectile points are dominant over Rosegate points, which could be explained by the time span during which Elko points are used, but this cannot explain the Carson Sink projectile point frequency. If we assume that the frequency occurrence of projectile points in an area roughly measures either (a) length of occupation or (b) intensity of occupation (and these are large assumptions) then the present frequency of Rosegate to Elko projectile points may indicate that the Carson Sink was used more intensively during Rosegate times than during other times. The high frequency of Humboldt points also supports this interpretation, if Bettinger's(1978) proposed time range of these points is accurate (appr. 700 A.D. to 1300 A.D.). There is a possible explanation for this reconstruction.

Current paleoclimatic data suggest that there may have been an increase in aridity during the period of 500 A.D. to approximately 1400 A.D. (Davis and Elston 1972), although the available data are by no means clear on this reconstruction (see Davis 1982). Assuming that there was an increase in aridity, however, leads to an interesting conclusion given the above argument proposing the prehistoric use of the Carson Sink as part of a back-up strategy. Meteorological measures indicate that in warm temperate environments, increased aridity is associated with more frequent and intensive stochastic variability in



3. Graph showing relationship between yearly rainfall variability and total annual precipitation (based on measures discussed in Colwell (1974)).

rainfall from year to year (see Colwell 1974). Data pertaining to this argument are shown in figure 3. An increase in yearly variability in rainfall between 500 and 1400 A.D. may have affected potential seed plants and the availability and/or distribution of animal populations, resulting in an increased need to rely upon back-up resources and, consequently, an increased occupation of the Carson Sink. This proposal still remains to be demonstrated by the CSAP analysis.

REFERENCES CITED

Aikens, C. Melvin

1978 Archaeology of the Great Basin. Annual Review of Anthropology 7: 71-78.

Bard, James C., C.I.Busby and J.M. Findlay

1981 A cultural resources overview of the Carson and Humboldt Sinks, Nevada. BLM Cultural Resources Series 2.

Baumhoff, M.A.

1958 Excavation of a cache cave in Pershing County, Nevada. California Archaeological Survey Reports 44: 14-25.

Binford, Lewis R.

1980 Willow smoke and dogs' tails: hunter-gatherer settlement systems and archaeological site formation. American Antiquity 45: 4-20.

Binford, Lewis R.

1982 The archaeology of place. Journal of Anthropological Archaeology 1: 5-31.

Bettinger, Robert L.

1978 Humboldt basal-notched bifaces as time markers in the western Great Basin. Tebiwa 10.

Bettinger, Robert L. and Martin A. Baumhoff

1982 The Numic spread: Great Basin cultures in competition. American Antiquity 47: 485-503.

Billings, W.D.

1945 The plant associations of the Carson Desert region, western Nevada. Butler University Botanical Studies 7: 1-35.

Byrne, Robert, C.I. Busby and Robert F. Heizer

1979 The altithermal revisited: pollen evidence from the Leonard Rockshelter. Journal of California and Great Basin Anthropology 1: 280-294.

Colwell, Robert K.

1974 Predictability, constancy and contingency of periodic phenomena. Ecology 55: 1148-1153.

Correll, D.S. and H.B.Correll

1972 Aquatic and wetland plants of southwestern United States, vol. 1. Stanford: Stanford University Press.

Davis, Jonathan O.

1982 Bits and Pieces: the last 35,000 years in the Lahontan area, in D.B.Madsen and J.F.O'Connell(eds.), Man and Environment in the Great Basin. SAA PaperNo. 2: 53-75.

Davis, J. and Robert Elston

1972 New stratigraphic evidence of Late Quaternary climatic change in northwestern Nevada, in D.D. Fowler(ed.), Great Basin Cultural Ecology. Desert Research Institute Publications in the Social Sciences 8, pp 43-55.

Driver, H.E. and W.C. Massey

1957 Comparative studies of North American Indians. Transactions of the American Philosphical Society 47 (pt 2).

Elsasser, A.B.

1958 The surface archaeology of site 26Pe05, Pershing Co., Nevada. University of California Archaeological Survey, Reporter 44(2): 26-56.

Hardesty, Donald

1969 A salvaged burial from Fallon. Nevada Archaeological Survey Reports 3(4): 10.

Harrington, H.D.

1967 Edible native plants of the Rocky Mountains. Albuquerque: University of New Mexico Press.

Harrington, M.R.

1933 A cat-tail eater. Masterkey 7(5): 147-149.

Heizer, Robert F.

1956 Recent cave explorations in the lower Humboldt Valley. University of California Archaeological Survey Reports 33: 50-57.

Heizer, Robert F. and C.W. Clewlow, Jr.

1968 Projectile points from site NV-Ch-15, Churchill County, Nevada. University of California Archaeological Survey Reports 71: 59-88.

Heizer, Robert F. and A.D. Krieger

1956 The archaeology of Humboldt Cave, Churchill County, Nevada. University of California Publications in American Archaeology and Ethnology 47.

Heizer, Robert F. and L.K. Napton

1970 Archaeology and the prehistoric Great Basin lacustrine subsistence regime as seen from Lovelock Cave, Nevada. Contributions of the University of California Archaeological Research Facility 10.

Heizer, Robert F. and A.E. Treganza

1944 Mines and quarries of the Indians of California, in R.F. Heizer and M.A. Whipple(eds.), The California Indians: A Sourcebook, 1971, Berkeley: University of California Press, pp. 347-359.

Jones, Kevin

1981 Patch choice models and the study of hunter-gatherer subsistence. Paper presented at the 1981 Annual Meeting of the Society for American Archaeology, San Diego.

Kelly, I.T.

1932 Ethnography of the Surprise Valley Paiute. University of California Publications in American Archaeology and Ethnology 31: 67-210.

Kelly, Robert L.

1980 Prehistoric lacustrine resource use in the Great Basin. Paper presented at the 1980 Great Basin Anthropological Conference, Salt Lake City.

Kelly, Robert L., Eric E. Ingbar and Martha S. Graham

1982 The Carson-Stillwater Archaeological Project: a preliminary report. Paper presented at the 1982 Great Basin Anthropological Conference, Reno.

Kelly, Robert L.

1983 Hunter-gatherer mobility strategies. Journal of Anthropological Research, in press.

Kintigh, K.W.

1982 K-means nonhierarchial cluster analysis. Ms. on file, Museum of Anthropology, University of Michigan.

Kintigh, K.W. and A.J. Ammerman

1982 Heuristic approaches to spatial analysis in archaeology. American Antiquity 47: 147-183.

Kroeber, A.L.

1922 Basket designs of the Mission Indians of California. Anthropological Papers of the American Museum of Natural History 20(pt 2): 147-183.

Kroeber, A.L.

1925 Handbook of the Indians of California. Bureau of American Ethnology Bulletin 18.

Kroeber, A.L. (ed.)

1935 Walapai ethnography. Memoirs of the American Anthropological Association 42.

Lee, Richard B.

1976 !Kung spatial organization: an ecological and historical perspective, in R.B. Lee and I. DeVore(eds.), Kalahari Hunter-Gatherers, Cambridge: Harvard University Press, pp. 73-97.

Loud, L.L. and M.R. Harrington

1929 Lovelock Cave. University of California Publications in American Archaeology and Ethnology 25: 1-183.

Madsen, David B.

1982 Get it where the gettin's good: a variable model of Great Basin subsistence and settlement based on data from the eastern Great Basin, in D.B. Madsen and J.F. O'Connell(eds.), Man and Environment in the Great Basin. SAA Paper No. 2: 207-226.

Mason, H.L.

1957 *A flora of the marshes of California*. Berkeley: University of California Press.

Morrison, Roger B.

1964 Lake Lahontan: geology of southern Carson Desert, Nevada. *United States Geological Survey Professional Paper* 401.

Napton, Lewis K.

1969 Archaeological and paleobiological investigations in Lovelock Cave, Nevada. *Kroeber Anthropological Society Papers, Special Publication* 2.

O'Connell J.F. and K. Hawkes

1981 Alyawara plant use and optimal foraging theory, in B. Winterhalder and E.A. Smith(eds.), *Hunter-gatherer Foraging Strategies*. Chicago: University of Chicago Press, pp. 99-125.

Peterson, N.

1968 The pestle and mortar: an ethnographic analogy for archaeology in Arnhem Land. *Mankind* 6: 567-570.

Powers, Stephen

1877 Tribes of California, in *Contributions to North American ethnology, Vol. 3, U.S. Geographical and Geological Survey of the Rocky Mountain region*. GPO: Washington, D.C.

Roust, N.L. and G.R.Grosscup

1952 The archaeology of Hidden Cave. Mimeo. On file at the Department of Anthropology, American Museum of Natural History.

Russell, Israel C.

1895 Present and extinct lakes of Nevada. *National Geographic Monographs* 4(1): 101-132.

Steward, Julian H.

1938 Basin-plateau aboriginal socio-politiocal groups. *Bureau of American Ethnology Bulletin* 120.

Swanton, J.R.

1946 The Indians of the southeastern United States. *Bureau of American Ethnology Bulletin* 43.

Thomas, David Hurst

1981 How to classify the projectile points from Monitor Valley, Nevada. Journal of California and Great Basin Anthropology 3(1): 7-43.

Thomas, David Hurst

n.d. The archaeology of Hidden Cave. Anthropological Papers of the American Museum of Natural History, in prep.

Thomas, David Hurst and Robert L. Kelly

1981 Carson-Stillwater Archaeological Project, Report of Activities: 1981. Federal Antiquity Permit Report, Permit Nos. 80-NV-152, 81-NV-244, STL-547.

Tuohy, Donald R.

1963 Archaeological survey in southwestern Idaho and northern Nevada. Nevada State Museum Anthropological Papers 8.

Tuohy, Donald R.

1974 A cache of fine-coiled, feathered and decorated baskets from western Nevada. Nevada State Museum Anthropological Papers 16: 28-46.

Tuohy, D.R. and M.C. Stein

1969 A late Lovelock shaman and his grave goods. Nevada State Museum Anthropological Papers 14: 96-130.

Weide, D.L.

1976 The altithermal as an archaeological "non-problem" in the Great Basin. Nevada Archaeological Survey Research Paper 6: 174-184.

Wheat, Margaret

1967 Survival arts of the primitive Paiutes. Reno: University of Nevada Press.

Wheeler, S.M. and G.N. Wheeler

1969 Cave burials near Fallon, Churchill County, Nevada. Nevada State Museum Anthropological Papers 14: 70-78.

Winterhalder, Bruce

1980 Environmental analysis in human evolution and adaptation research. Human Ecology 8: 135-170.

Winterhalder, Bruce

1981 Foraging strategies in the boreal forest: an analysis of Cree hunting and gathering, in B. Winterhalder and E.A. Smith (eds.), Hunter-Gatherer Foraging Strategies, Chicago: University of Chicago Press, pp. 66-98.

APPENDIX

In this appendix a computer listing is presented of metric and non-metric data on 356 projectile points; all linear measurements are in mms., weight is in grams, notch opening, DSA, and PSA are in degrees (measured to the nearest 5 degrees). The variables are:

0. case identification number
1. portion (1=complete, 2=missing tip, 3=base, 4=fragment)
2. total length
3. axial length
4. medial length
5. maximum width
6. basal width
7. thickness
8. neck width
9. notch opening
10. distal shoulder angle
11. proximal shoulder angle
12. weight
13. technology (bif=bifacially flaked, uni=unifacially flaked, unk,miss=unknown or missing data)
14. heat-treatment (Y=yes, N=no, U=uncertain)
15. material (obs=obsidian, chh=high quality chert, chl=average to low quality chert, cha=chalcedony, bas=basalt, won=wonderstone, qrt=quartzite, oth=other)
16. recycling (Y=yes, N=no, U=uncertain)
17. type (DSN=Desert Side Notch, CTT=Cottonwood Triangular, CLS=Cottonwood Leaf-Shape, HUM=Humboldt, LSN=Large Side Notch, RSG=Rosegate, ECN=Elko Corner Notch, EEE=Elko Eared, GSS=Gatecliff Split Stem, GCS=Gatecliff Contracting Stem, CAR=Carson, UNK=unknown
18. Basal indentation ratio (var.3/var.2)
19. Maximum width position (var.4/var.2)
20. Ratio of basal width to maximum width

DESERT SIDE NOTCH

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(64)	DSN	1.0000	24.500	23.000	0.	11.500	11.500	2.5000	5.5000	.70000
(70)	DSN	1.0000	15.000	13.000	0.	11.000	11.000	2.0000	4.0000	.30000
(73)	DSN	1.0000	22.000	22.000	0.	11.500	11.500	3.5000	6.0000	.70000
(112)	DSN	1.0000	24.000	22.000	0.	15.500	15.500	-0.	7.5000	-0.
(113)	DSN	1.0000	22.000	20.000	0.	11.500	11.500	-0.	7.0000	-0.
(122)	DSN —	1.0000	21.000	19.000	8.0000	12.000	12.000	3.0000	6.0000	.50000
(140)	DSN	1.0000	27.000	25.500	0.	12.000	12.000	3.5000	8.0000	.60000
(178)	DSN	1.0000	23.500	22.000	0.	12.500	12.500	3.5000	8.0000	.80000
(179)	DSN	1.0000	23.000	22.000	0.	12.000	12.000	2.5000	8.0000	.80000
(182)	DSN	1.0000	29.000	26.000	0.	15.000	15.000	3.0000	9.0000	1.1000
(193)	DSN	1.0000	17.000	14.500	0.	11.000	11.000	3.5000	8.0000	.50000
(194)	DSN	1.0000	22.000	19.500	0.	12.500	12.500	3.0000	7.0000	.70000
(198)	DSN	1.0000	18.000	17.000	0.	14.000	14.000	3.0000	8.0000	.70000
(202)	DSN	1.0000	18.000	18.000	0.	12.000	12.000	2.0000	5.0000	.40000
(204)	DSN	1.0000	18.500	17.500	0.	13.000	13.000	3.5000	7.5000	.70000
(205)	DSN	1.0000	17.500	15.000	0.	12.000	12.000	4.0000	7.0000	.70000
(211)	DSN	1.0000	22.000	19.500	0.	12.500	12.500	3.0000	7.0000	.90000
(223)	DSN	1.0000	26.500	24.000	0.	14.000	14.000	3.0000	6.0000	.70000
(239)	DSN	1.0000	24.000	22.000	0.	10.500	10.500	2.0000	7.5000	-0.
(242)	DSN	1.0000	27.000	26.000	0.	12.000	12.000	3.0000	8.0000	-0.
(277)	DSN	3.0000	-0.	-0.	0.	13.000	13.000	2.0000	9.0000	1.0000
(281)	DSN	2.0000	27.000	26.000	0.	12.000	12.000	3.0000	8.0000	-0.
(282)	DSN	2.0000	28.000	25.000	0.	15.000	15.000	2.5000	9.0000	-0.
(283)	DSN	3.0000	29.500	28.000	0.	13.000	13.000	2.0000	8.0000	-0.
(284)	DSN	3.0000	-0.	-0.	0.	15.000	15.000	3.0000	7.5000	-0.
(285)	DSN	1.0000	25.000	23.000	0.	9.5000	9.5000	3.0000	5.5000	.60000
(287)	DSN	3.0000	-0.	-0.	0.	13.500	13.500	2.5000	8.0000	-0.

DESERT SIDE NOTCH

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(64)	20.000	200.00	180.00	BIF	N	CHL	N	.93878	0.	1.0000
(70)	60.000	220.00	160.00	BIF	N	OBS	Y	.86667	0.	1.0000
(73)	40.000	220.00	180.00	BIF	N	OBS	Y	1.0000	0.	1.0000
(112)	10.000	185.00	180.00	MISS	U	OBS	Y	.91667	0.	1.0000
(113)	40.000	210.00	175.00	MISS	U	OBS	N	.90909	0.	1.0000
(122)	30.000	180.00	170.00	BIF	N	OBS	N	.90476	.38095	1.0000
(140)	40.000	190.00	170.00	BIF	N	CHL	N	.94444	0.	1.0000
(178)	35.000	100.00	160.00	BIF	N	OBS	N	.93617	0.	1.0000
(179)	25.000	190.00	175.00	UNI	Y	CHL	N	.95652	0.	1.0000
(182)	15.000	180.00	170.00	BIF	N	CHL	N	.89655	0.	1.0000
(193)	60.000	210.00	160.00	BIF	N	OBS	U	.85294	0.	1.0000
(194)	40.000	220.00	180.00	BIF	N	OBS	N	.88636	0.	1.0000
(198)	40.000	200.00	170.00	BIF	N	OBS	Y	.94444	0.	1.0000
(202)	40.000	210.00	180.00	BIF	N	OBS	Y	1.0000	0.	1.0000
(204)	35.000	200.00	175.00	BIF	N	CHL	U	.94595	0.	1.0000
(205)	100.00	230.00	150.00	BIF	N	CHL	Y	.85714	0.	1.0000
(211)	20.000	190.00	170.00	BIF	N	CHL	N	.88636	0.	1.0000
(223)	15.000	185.00	170.00	BIF	N	OBS	U	.90566	0.	1.0000
(239)	30.000	190.00	160.00	BIF	N	OBS	N	.91667	0.	1.0000
(242)	80.000	190.00	135.00	BIF	N	OBS	N	.96296	0.	1.0000
(277)	85.000	220.00	170.00	UNI	N	CHH	N	-0.	-0.	1.0000
(281)	35.000	180.00	160.00	BIF	N	OBS	N	.96296	0.	1.0000
(282)	40.000	200.00	170.00	UNI	N	CHL	N	.89286	0.	1.0000
(283)	30.000	180.00	165.00	UNI	N	CHL	N	.94915	0.	1.0000
(284)	35.000	200.00	175.00	UNI	Y	CHA	N	-0.	-0.	1.0000
(285)	50.000	210.00	160.00	BIF	N	CHL	N	.92000	0.	1.0000
(287)	20.000	200.00	170.00	UNI	N	CHL	U	-0.	-0.	1.0000

0	17	1	2	3	4	5	6	7	8	12
(288)	DSN	3.0000	-0.	-0.	0.	14.000	14.000	2.5000	7.0000	-0.
(289)	DSN	-0.	-0.	-0.	0.	12.000	12.000	3.0000	6.0000	-0.
(290)	DSN	3.0000	-0.	-0.	-0.	-0.	14.000	2.0000	7.0000	-0.
(291)	DSN	3.0000	-0.	-0.	0.	13.000	13.000	2.5000	7.0000	-0.
(292)	DSN	3.0000	-0.	-0.	0.	14.000	14.000	3.0000	8.0000	-0.
(293)	DSN	3.0000	-0.	-0.	0.	15.000	15.000	2.5000	8.0000	-0.
(294)	DSN	3.0000	-0.	-0.	0.	13.500	13.500	2.0000	8.0000	-0.
(296)	DSN	-0.	-0.	-0.	0.	12.000	12.000	2.5000	6.0000	-0.
(297)	DSN	3.0000	20.500	18.000	0.	10.000	10.000	3.0000	7.0000	-0.
(298)	DSN	1.0000	19.500	-0.	0.	10.000	10.000	3.0000	7.0000	-0.
(300)	DSN	3.0000	-0.	-0.	0.	12.000	12.000	3.0000	7.0000	-0.
(301)	DSN	1.0000	22.000	19.000	0.	12.000	12.000	2.5000	5.5000	-0.
(303)	DSN	3.0000	-0.	-0.	-0.	-0.	11.000	2.5000	6.0000	-0.
(304)	DSN	1.0000	19.500	19.500	0.	9.0000	9.0000	3.0000	6.0000	-0.
(305)	DSN	1.0000	24.000	23.000	0.	10.000	10.000	3.0000	7.0000	-0.
(307)	DSN	3.0000	-0.	-0.	0.	10.000	10.000	3.0000	6.0000	-0.
(308)	DSN	4.0000	14.500	13.500	0.	14.000	14.000	2.5000	6.0000	-0.
(313)	DSN	1.0000	29.500	28.500	0.	13.000	13.000	3.5000	9.0000	1.1000
(314)	DSN	1.0000	24.000	21.500	0.	13.000	13.000	2.0000	6.5000	.70000
(315)	DSN	2.0000	12.000	9.0000	0.	15.000	15.000	2.5000	7.0000	.30000
(319)	DSN	2.0000	27.000	25.000	0.	11.000	11.000	2.5000	6.5000	.90000
(320)	DSN	2.0000	20.500	18.500	0.	10.000	10.000	3.0000	5.0000	.50000
(321)	DSN	3.0000	-0.	-0.	0.	12.000	12.000	2.0000	7.5000	.80000
(322)	DSN	2.0000	32.000	27.000	0.	17.000	17.000	4.0000	10.000	1.4000
(323)	DSN	2.0000	24.000	24.000	0.	15.000	15.000	2.0000	-0.	.70000
(324)	DSN	3.0000	-0.	-0.	0.	14.000	14.000	2.0000	7.5000	-0.
(325)	DSN	2.0000	23.000	19.000	0.	14.000	14.000	3.5000	7.0000	1.1000
(326)	DSN	3.0000	-0.	-0.	0.	12.000	12.000	2.0000	7.0000	-0.
(327)	DSN	2.0000	20.000	18.000	0.	13.500	13.500	3.0000	8.0000	.90000
(328)	DSN	2.0000	22.500	19.500	0.	12.000	12.000	2.0000	6.0000	.60000

DESERT SIDE NOTCH

0	9	10	11	13	14	15	16	18	19	20
(288)	30.000	190.00	170.00	BIF	N	OBS	N	-0.	-0.	1.0000
(289)	30.000	180.00	170.00	BIF	N	CHL	U	-0.	-0.	1.0000
(290)	-0.	-0.	170.00	UNI	N	CHL	U	-0.	-0.	-0.
(291)	35.000	200.00	170.00	BIF	N	OBS	U	-0.	-0.	1.0000
(292)	35.000	205.00	170.00	BIF	N	CHL	U	-0.	-0.	1.0000
(293)	20.000	180.00	175.00	BIF	N	CHL	U	-0.	-0.	1.0000
(294)	20.000	200.00	170.00	UNI	N	CHA	U	-0.	-0.	1.0000
(296)	25.000	185.00	165.00	BIF	N	CHA	U	-0.	-0.	1.0000
(297)	80.000	200.00	160.00	BIF	N	OBS	N	.87805	0.	1.0000
(298)	80.000	240.00	165.00	BIF	N	CHL	Y	-0.	0.	1.0000
(300)	40.000	195.00	165.00	BIF	N	CHL	N	-0.	-0.	1.0000
(301)	60.000	205.00	170.00	BIF	N	CHL	Y	.86364	0.	1.0000
(303)	-0.	-0.	170.00	BIF	N	CHL	U	-0.	-0.	-0.
(304)	50.000	210.00	165.00	BIF	N	CHL	Y	1.0000	0.	1.0000
(305)	40.000	180.00	140.00	BIF	N	CHL	N	.95833	0.	1.0000
(307)	50.000	210.00	160.00	UNI	N	CHL	N	-0.	-0.	1.0000
(308)	-0.	-0.	180.00	BIF	N	OBS	Y	.93103	0.	1.0000
(313)	70.000	200.00	150.00	BIF	N	CHA	N	.96610	0.	1.0000
(314)	20.000	200.00	180.00	BIF	N	CHL	N	.89583	0.	1.0000
(315)	-0.	-0.	-0.	BIF	N	CHL	Y	.75000	0.	1.0000
(319)	20.000	200.00	170.00	UNI	N	CHL	N	.92593	0.	1.0000
(320)	30.000	195.00	170.00	BIF	N	OBS	N	.90244	0.	1.0000
(321)	40.000	200.00	165.00	UNI	N	CHL	U	-0.	-0.	1.0000
(322)	30.000	230.00	180.00	BIF	N	CHA	N	.84375	0.	1.0000
(323)	-0.	180.00	-0.	UNI	N	CHL	N	1.0000	0.	1.0000
(324)	35.000	180.00	160.00	BIF	N	OBS	U	-0.	-0.	1.0000
(325)	30.000	200.00	175.00	BIF	U	CHL	N	.82609	0.	1.0000
(326)	30.000	140.00	175.00	UNI	N	CHL	U	-0.	-0.	1.0000
(327)	30.000	200.00	175.00	BIF	N	CHL	N	.90000	0.	1.0000
(328)	15.000	180.00	180.00	BIF	N	CHL	N	.86667	0.	1.0000

0	17	1	2	3	4	5	6	7	8	12
(329)	DSN	2.0000	24.500	21.000	0.	11.000	11.000	1.5000	7.0000	.50000
(330)	DSN	2.0000	16.000	14.500	0.	13.000	13.000	2.5000	7.5000	.40000
(331)	DSN	3.0000	-0.	-0.	0.	15.000	15.000	2.0000	8.0000	.60000
(332)	DSN	1.0000	28.000	24.500	0.	15.000	15.000	3.5000	7.0000	.80000
(333)	DSN	1.0000	20.500	19.000	0.	13.500	13.500	4.0000	9.0000	.80000
(334)	DSN	1.0000	19.000	17.000	0.	14.500	14.500	2.0000	10.000	.70000
(335)	DSN	1.0000	18.500	16.000	0.	9.5000	9.5000	1.5000	6.0000	.30000
(339)	DSN	1.0000	22.000	19.500	0.	12.000	12.000	3.0000	7.0000	.90000
(340)	DSN	1.0000	18.000	16.000	0.	10.500	10.500	2.5000	6.0000	.60000
(341)	DSN	1.0000	17.500	16.000	0.	12.000	12.000	2.5000	6.5000	.50000
(342)	DSN	1.0000	16.500	15.500	0.	11.000	11.000	3.5000	6.0000	.50000
(343)	DSN	1.0000	22.000	20.000	0.	14.000	14.000	3.5000	6.0000	.90000
(344)	DSN	1.0000	26.000	25.000	0.	12.500	12.500	3.0000	8.0000	.90000
(345)	DSN	1.0000	17.000	16.000	0.	12.000	12.000	2.5000	7.5000	.50000
(349)	DSN	1.0000	30.000	27.000	0.	12.000	12.000	3.0000	8.0000	1.0000
(350)	DSN	1.0000	18.000	14.000	0.	13.000	13.000	2.5000	7.0000	.60000
(351)	DSN	1.0000	19.000	17.000	0.	12.500	12.500	2.5000	6.5000	.50000
(352)	DSN	1.0000	18.000	17.000	0.	8.5000	8.5000	3.0000	5.0000	.50000
(353)	DSN	1.0000	19.000	19.000	0.	8.0000	8.0000	3.0000	4.5000	.50000
(354)	DSN	1.0000	15.000	12.500	0.	10.000	10.000	2.0000	4.5000	.20000
(355)	DSN	1.0000	18.000	16.000	0.	13.000	13.000	2.5000	8.0000	.60000

COTTONWOOD TRIANGULAR

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(57)	CTT	1.0000	25.000	24.000	0.	12.000	12.000	3.5000	0.	1.0000
(171)	CTT	1.0000	27.000	24.000	0.	12.000	12.000	4.0000	0.	1.2000
(176)	CTT	1.0000	24.500	21.500	0.	13.000	13.000	3.0000	0.	1.1000
(197)	CTT	1.0000	21.500	19.000	0.	13.000	13.000	4.5000	0.	1.5000
(236)	CTT	1.0000	36.000	36.000	0.	16.000	16.000	5.0000	0.	-0.

DESERT SIDE NOTCH

0	9	10	11	13	14	15	16	18	19	20
(329)	40.000	210.00	165.00	UNI	N	CHA	N	.85714	0.	1.0000
(330)	30.000	-0.	-0.	UNI	N	CHL	U	.90625	0.	1.0000
(331)	20.000	185.00	170.00	UNI	N	CHA	U	-0.	-0.	1.0000
(332)	50.000	220.00	165.00	BIF	N	CHL	N	.87500	0.	1.0000
(333)	45.000	210.00	175.00	BIF	N	CHL	N	.92683	0.	1.0000
(334)	35.000	190.00	140.00	UNI	N	CHA	N	.89474	0.	1.0000
(335)	70.000	210.00	150.00	UNI	N	CHL	Y	.86486	0.	1.0000
(339)	30.000	200.00	175.00	UNI	N	CHL	N	.88636	0.	1.0000
(340)	25.000	200.00	165.00	BIF	N	CHL	N	.88889	0.	1.0000
(341)	35.000	180.00	160.00	BIF	N	CHL	U	.91429	0.	1.0000
(342)	45.000	200.00	165.00	BIF	N	CHL	U	.93939	0.	1.0000
(343)	75.000	220.00	155.00	BIF	N	OBS	Y	.90909	0.	1.0000
(344)	60.000	220.00	160.00	BIF	N	CHL	N	.96154	0.	1.0000
(345)	70.000	220.00	160.00	BIF	N	CHL	Y	.94118	0.	1.0000
(349)	25.000	200.00	165.00	BIF	N	CHL	N	.90000	0.	1.0000
(350)	20.000	200.00	180.00	UNI	N	CHL	U	.77778	0.	1.0000
(351)	40.000	180.00	160.00	BIF	N	CHL	N	.89474	0.	1.0000
(352)	35.000	195.00	150.00	BIF	N	OBS	U	.94444	0.	1.0000
(353)	60.000	210.00	150.00	UNI	N	OBS	U	1.0000	0.	1.0000
(354)	40.000	210.00	170.00	BIF	N	OBS	U	.83333	0.	1.0000
(355)	15.000	190.00	175.00	BIF	N	CHL	U	.88889	0.	1.0000

COTTONWOOD TRIANGULAR

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(57)	0.	0.	0.	BIF	N	OBS	N	.96000	0.	1.0000
(171)	0.	0.	0.	BIF	N	OBS	N	.88889	0.	1.0000
(176)	0.	0.	0.	BIF	N	CHL	Y	.87755	0.	1.0000
(197)	0.	0.	0.	BIF	N	CHL	N	.88372	0.	1.0000
(236)	0.	0.	0.	BIF	N	CHL	N	1.0000	0.	1.0000

0	17	1	2	3	4	5	6	7	8	12
(248)	CTT	3.0000	-0.	-0.	0.	18.000	18.000	4.5000	0.	-0.
(249)	CTT	3.0000	-0.	-0.	0.	15.000	15.000	4.0000	0.	-0.
(250)	CTT	3.0000	-0.	-0.	0.	12.000	12.000	4.0000	0.	-0.
(251)	CTT	3.0000	-0.	-0.	0.	17.500	17.500	4.5000	0.	-0.
(252)	CTT	3.0000	-0.	-0.	0.	16.500	16.500	4.5000	0.	-0.
(253)	CTT	3.0000	-0.	-0.	0.	16.000	16.000	4.0000	0.	-0.
(254)	CTT	3.0000	-0.	-0.	0.	14.500	14.500	3.5000	0.	-0.
(255)	CTT	3.0000	-0.	-0.	0.	15.000	15.000	5.5000	0.	-0.
(256)	CTT	2.0000	-0.	-0.	0.	16.500	16.500	4.5000	0.	-0.
(257)	CTT	1.0000	21.500	21.000	0	13.500	13.500	4.0000	0.	-0.
(258)	CTT	3.0000	-0.	-0.	0.	19.500	19.500	4.5000	0.	-0.
(260)	CTT	3.0000	-0.	-0.	0.	16.000	16.000	5.5000	0.	-0.
(261)	CTT	3.0000	-0.	-0.	0.	17.500	17.500	3.0000	0.	-0.
(262)	CTT	3.0000	-0.	-0.	0.	15.000	15.000	3.5000	0.	-0.
(263)	CTT	3.0000	-0.	-0.	0.	12.000	12.000	3.0000	0.	-0.
(264)	CTT	3.0000	-0.	-0.	0.	14.000	14.000	2.0000	0.	-0.
(265)	CTT	3.0000	-0.	-0.	0.	13.000	13.000	3.5000	0.	-0.
(266)	CTT	3.0000	-0.	-0.	0.	18.000	18.000	3.5000	0.	-0.
(267)	CTT	1.0000	16.000	14.000	0.	11.000	11.000	2.0000	0.	.30000
(268)	CTT	1.0000	23.500	23.000	0.	16.000	16.000	2.5000	0.	1.1000
(269)	CTT	3.0000	-0.	-0.	0.	15.000	15.000	3.0000	0.	-0.
(270)	CTT	3.0000	-0.	-0.	0.	14.500	14.500	3.0000	0	-0.
(271)	CTT	3.0000	-0.	-0.	0.	16.000	16.000	2.5000	0.	-0.
(272)	CTT	3.0000	-0.	-0.	0.	12.000	12.000	2.0000	0.	-0.
(273)	CTT	3.0000	-0.	-0.	0.	12.000	12.000	4.0000	0.	-0.
(274)	CTT	1.0000	15.500	15.500	0.	10.500	10.500	2.0000	0.	-0.
(275)	CTT	1.0000	14.500	14.500	0.	9.5000	9.5000	3.0000	0.	-0.
(276)	CTT	3.0000	-0.	-0.	0.	14.000	14.000	2.5000	0.	-0.
(311)	CTT	2.0000	25.000	23.000	0.	12.000	12.000	3.0000	0.	-0.
(316)	CTT	2.0000	28.000	27.000	0.	14.000	14.000	4.0000	0.	1.3000

COTTONWOOD TRIANGULAR

0	9	10	11	13	14	15	16	18	19	20
(248)	0.	0.	0.	BIF	N	OBS	N	-0.	-0	1.0000
(249)	0.	0.	0.	BIF	N	OBS	N	-0.	-0.	1.0000
(250)	0.	0.	0.	BIF	N	OBS	N	-0.	-0.	1.0000
(251)	0.	0.	0.	BIF	N	OBS	N	-0.	-0.	1.0000
(252)	0.	0.	0.	BIF	N	OBS	N	-0.	-0.	1.0000
(253)	0.	0.	0.	BIF	N	CHL	N	-0.	-0.	1.0000
(254)	0.	0.	0.	UNI	N	CHL	N	-0.	-0.	1.0000
(255)	0.	0.	0.	UNI	N	CHL	N	-0.	-0.	1.0000
(256)	0.	0.	0.	UNI	N	CHH	N	-0.	-0	1.0000
(257)	0.	0.	0.	BIF	N	CHL	N	.97674	0.	1.0000
(258)	0.	0.	0.	BIF	N	CHL	N	-0	-0.	1.0000
(260)	0.	0.	0.	BIF	N	CHH	N	-0.	-0.	1.0000
(261)	0.	0.	0.	BIF	N	CHL	N	-0.	-0.	1.0000
(262)	0.	0.	0.	BIF	N	CHH	N	-0.	-0.	1.0000
(263)	0.	0.	0.	BIF	N	CHL	N	-0.	-0.	1.0000
(264)	0.	0.	0.	UNI	N	CHL	N	-0.	-0	1.0000
(265)	0.	0.	0.	BIF	N	CHL	N	-0.	-0.	1.0000
(266)	0.	0.	0.	BIF	N	CHL	N	-0.	-0.	1.0000
(267)	0.	0.	0.	UNI	N	CHL	N	.87500	0.	1.0000
(268)	0.	0.	0.	UNI	N	CHH	N	.97872	0.	1.0000
(269)	0.	0.	0.	UNI	N	CHL	N	-0.	-0.	1.0000
(270)	0.	0.	0.	BIF	N	OBS	N	-0.	-0.	1.0000
(271)	0.	0.	0.	UNI	N	CHH	N	-0.	-0.	1.0000
(272)	0.	0.	0.	BIF	N	CHH	N	-0.	-0.	1.0000
(273)	0.	0.	0.	BIF	N	CHL	N	-0.	-0.	1.0000
(274)	0.	0.	0.	UNI	N	CHL	N	1.0000	0.	1.0000
(275)	0.	0.	0	BIF	N	CHL	N	1.0000	0.	1.0000
(276)	0.	0.	0	UNI	N	CHL	N	-0.	-0.	1.0000
(311)	0.	0.	0.	UNI	N	CHL	N	.92000	0.	1.0000
(316)	0.	0.	0.	BIF	N	CHL	N	.96429	0.	1.0000

0	17	1	2	3	4	5	6	7	8	12
(318)	CTT	2.0000	19.000	18.000	0.	9.5000	9.5000	4.0000	0.	.60000
(336)	CTT	1.0000	16.000	16.000	0.	15.000	15.000	2.0000	0.	.60000
(346)	CTT	1.0000	23.500	22.000	0.	12.000	12.000	3.5000	0.	1.1000
(348)	CTT	1.0000	25.500	25.500	0.	11.000	11.000	2.5000	0.	.80000
(356)	CTT	1.0000	20.000	20.000	0.	12.000	12.000	4.0000	0.	.40000

COTTONWOOD LEAF SHAPE

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(12)	CLS	1.0000	28.000	28.000	12.500	12.000	2.0000	3.0000	0.	1.0000
(45)	CLS	1.0000	28.000	26.500	6.0000	8.0000	7.5000	5.0000	0.	1.1000
(79)	CLS	1.0000	21.000	19.000	7.0000	11.000	10.500	4.0000	0.	1.0000
(146)	CLS	1.0000	33.000	33.000	16.500	9.5000	2.0000	4.5000	0.	1.4000
(149)	CLS	1.0000	27.000	25.000	12.000	12.500	10.500	5.0000	0.	1.5000
(161)	CLS	1.0000	28.000	28.000	12.500	10.500	5.5000	4.0000	0.	.90000
(259)	CLS	3.0000	-0.	-0.	13.000	16.500	12.500	4.0000	0.	-0.

HUMBOLDT

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(11)	HUM	1.0000	37.000	34.000	0.	12.000	12.000	6.0000	0.	2.5000
(20)	HUM	1.0000	43.500	41.000	15.000	13.500	9.0000	4.5000	0.	2.7000
(22)	HUM	1.0000	28.000	24.500	8.5000	15.000	8.0000	11.500	0.	2.1000
(31)	HUM	1.0000	31.500	30.000	11.000	13.500	9.0000	4.0000	0.	1.5000
(36)	HUM	1.0000	32.500	30.000	0.	11.000	11.000	4.5000	0.	1.4000
(53)	HUM	1.0000	31.000	30.000	11.500	11.000	8.0000	5.0000	0.	1.7000
(60)	HUM	1.0000	34.000	33.000	13.000	10.000	7.0000	5.0000	0.	1.6000
(62)	HUM	1.0000	22.500	20.500	0.	12.000	12.000	2.0000	0.	.70000
(75)	HUM	1.0000	30.000	28.000	6.0000	14.000	13.000	4.5000	0.	1.7000
(76)	HUM	1.0000	22.500	21.000	6.5000	11.000	10.500	3.5000	0.	1.0000

COTTONWOOD TRIANGULAR

0	9	10	11	13	14	15	16	18	19	20
(318)	0.	0.	0.	BIF	N	OBS	U	.94737	0.	1.0000
(336)	0.	0.	0.	BIF	N	CHL	N	1.0000	0.	1.0000
(346)	0.	0.	0.	UNI	N	ORT	N	.93617	0.	1.0000
(348)	0.	0.	0.	UNI	N	CHA	N	1.0000	0.	1.0000
(356)	0.	0.	0.	BIF	N	OBS	Y	1.0000	0.	1.0000

COTTONWOOD LEAF SHAPE

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(12)	0.	0.	0.	BIF	N	OBS	N	1.0000	.44643	.16667
(45)	0.	0.	0.	BIF	N	OBS	U	.94643	.21429	.93750
(79)	0.	0.	0.	BIF	N	OBS	N	.90476	.33333	.95455
(146)	0.	0.	0.	BIF	N	OBS	N	1.0000	.50000	.21053
(149)	0.	0.	0.	BIF	N	CHL	N	.92593	.44444	.84000
(161)	0.	0.	0.	BIF	N	OBS	N	1.0000	.44643	.52381
(259)	0.	0.	0.	UNI	N	CHL	N	-0.	-0.	.75758

HUMBOLDT

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(11)	0.	0.	0.	BIF	N	OBS	U	.91892	0.	1.0000
(20)	0.	0.	0.	UNI	U	CHA	Y	.94253	.34483	.66667
(22)	0.	0.	0.	BIF	N	OBS	U	.87500	.30357	.53333
(31)	0.	0.	0.	BIF	N	OBS	Y	.95238	.34921	.66667
(36)	0.	0.	0.	BIF	N	OBS	N	.92308	0.	1.0000
(53)	0.	0.	0.	BIF	N	OBS	N	.96774	.37097	.72727
(60)	0.	0.	0.	BIF	N	OBS	N	.97059	.38235	.70000
(62)	0.	0.	0.	UNI	N	OBS	N	.91111	0.	1.0000
(75)	0.	0.	0.	BIF	N	OBS	N	.93333	.20000	.92857
(76)	0.	0.	0.	BIF	N	OBS	U	.93333	.28889	.95455

0	17	1	2	3	4	5	6	7	8	12
(77)	HUM	1.0000	22.000	21.000	4.5000	8.0000	7.5000	4.5000	0.	.90000
(86)	HUM	1.0000	45.000	43.500	14.000	10.500	9.0000	4.0000	0.	2.7000
(88)	HUM	1.0000	47.000	42.000	0.	21.000	21.000	5.5000	0.	4.5000
(93)	HUM	1.0000	38.000	35.500	0.	12.000	12.000	4.0000	0.	1.9000
(101)	HUM	1.0000	40.000	37.500	0.	14.000	14.000	4.5000	0.	2.9000
(102)	HUM	1.0000	34.500	32.000	10.000	13.000	9.5000	4.0000	0.	1.5000
(119)	HUM	1.0000	31.000	29.000	3.0000	13.000	11.000	5.0000	0.	1.6000
(124)	HUM	1.0000	28.000	26.000	13.000	14.000	10.000	5.0000	0.	1.5000
(128)	HUM	1.0000	48.000	45.000	10.000	15.000	12.000	4.0000	0.	2.5000
(135)	HUM	1.0000	36.500	34.000	0.	11.500	11.500	3.0000	0.	1.5000
(137)	HUM	1.0000	27.500	26.500	12.500	13.500	8.5000	5.0000	0.	1.5000
(144)	HUM	1.0000	38.000	37.000	13.000	16.500	8.5000	5.0000	0.	3.0000
(147)	HUM	1.0000	53.000	50.000	15.500	16.000	12.500	7.5000	0.	4.7000
(150)	HUM	1.0000	36.000	34.000	13.500	12.000	9.0000	4.0000	0.	1.4000
(151)	HUM	1.0000	36.500	34.000	14.000	12.500	9.0000	4.5000	0.	1.8000
(152)	HUM	1.0000	37.000	35.000	17.000	13.000	7.0000	4.5000	0.	1.8000
(153)	HUM	1.0000	51.500	48.500	25.000	20.000	12.500	7.0000	0.	8.0000
(154)	HUM	1.0000	36.500	33.500	14.000	16.000	14.000	6.0000	0.	3.3000
(155)	HUM	1.0000	43.000	41.500	0.	11.000	11.000	5.5000	0.	2.0000
(156)	HUM	1.0000	26.500	26.500	11.500	13.500	8.0000	4.8000	0.	1.5000
(164)	HUM	1.0000	33.000	31.500	15.500	13.000	8.0000	5.0000	0.	1.8000
(169)	HUM	1.0000	36.500	36.500	15.000	17.000	9.0000	6.5000	0.	3.2000
(170)	HUM	1.0000	38.000	35.500	13.500	14.000	7.5000	5.0000	0.	1.9000
(174)	HUM	1.0000	36.000	36.000	18.000	10.000	7.0000	4.5000	0.	1.7000
(175)	HUM	1.0000	28.000	27.000	11.000	11.500	8.0000	4.0000	0.	1.2000
(177)	HUM	1.0000	24.000	23.000	0.	16.000	16.000	4.5000	0.	1.2000
(181)	HUM	1.0000	40.500	38.000	16.500	13.000	12.000	5.0000	0.	2.1000
(206)	HUM	1.0000	68.000	67.000	24.000	21.000	8.0000	6.0000	0.	7.8000
(209)	HUM	1.0000	45.500	43.000	6.0000	15.000	13.000	4.0000	0.	3.0000
(214)	HUM	1.0000	31.500	30.500	13.500	12.000	-0.	4.0000	0.	1.5000

HUMBOLDT

0	9	10	11	13	14	15	16	18	19	20
(77)	0.	0.	0.	BIF	N	OBS	U	.95455	.20455	.93750
(86)	0.	0.	0.	BIF	Y	CHL	N	.96667	.31111	.85714
(88)	0.	0.	0.	BIF	N	OBS	U	.89362	0.	1.0000
(93)	0.	0.	0.	BIF	N	CHH	N	.93421	0.	1.0000
(101)	0.	0.	0.	BIF	N	OBS	N	.93750	0.	1.0000
(102)	0.	0.	0.	BIF	N	OBS	N	.92754	.28986	.73077
(119)	0.	0.	0.	BIF	N	OBS	N	.93548	.96774 -1	.84615
(124)	0.	0.	0.	BIF	U	OBS	N	.92857	.46429	.71429
(128)	0.	0.	0.	BIF	N	OBS	N	.93750	.20833	.80000
(135)	0.	0.	0.	UNI	N	OBS	N	.93151	0.	1.0000
(137)	0.	0.	0.	BIF	N	OBS	N	.96364	.45455	.62963
(144)	0.	0.	0.	BIF	N	OBS	N	.97368	.34211	.51515
(147)	0.	0.	0.	BIF	N	CHL	N	.94340	.29245	.78125
(150)	0.	0.	0.	BIF	N	OBS	N	.94444	.37500	.75000
(151)	0.	0.	0.	UNI	N	CHL	N	.93151	.38356	.72000
(152)	0.	0.	0.	UNI	N	CHL	N	.94595	.45946	.53846
(153)	0.	0.	0.	BIF	N	BAS	N	.94175	.48544	.62500
(154)	0.	0.	0.	BIF	N	CHL	N	.91781	.38356	.87500
(155)	0.	0.	0.	BIF	N	OBS	N	.96512	0.	1.0000
(156)	0.	0.	0.	BIF	N	OBS	U	1.0000	.43396	.59259
(164)	0.	0.	0.	BIF	N	OBS	U	.95455	.46970	.61538
(169)	0.	0.	0.	BIF	N	OBS	N	1.0000	.41096	.52941
(170)	0.	0.	0.	BIF	N	OBS	U	.93421	.35526	.53571
(174)	0.	0.	0.	UNI	N	CHL	U	1.0000	.50000	.70000
(175)	0.	0.	0.	BIF	N	OBS	N	.96429	.39286	.69565
(177)	0.	0.	0	BIF	N	OBS	N	.95833	0.	1.0000
(181)	0.	0.	0.	BIF	N	OBS	N	.93827	.40741	.92308
(206)	0.	0.	0.	BIF	N	OBS	N	.98529	.35294	.38095
(209)	0.	0.	0.	BIF	N	CHL	N	.94505	.13187	.86667
(214)	0.	0.	0.	BIF	N	BAS	N	.86825	.42857	-0.

0	17	1	2	3	4	5	6	7	8	12
(217)	HUM	1.0000	50.000	43.500	0.	20.000	20.000	6.0000	0.	6.4000

LARGE SIDE NOTCH

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(14)	LSN	1.0000	36.000	36.000	8.5000	19.000	10.000	5.5000	8.5000	1.7000
(103)	LSN	4.0000	42.000	38.000	0.	24.000	24.000	5.0000	10.500	3.7000
(188)	LSN	1.0000	19.000	19.000	-0.	-0.	24.500	5.0000	11.000	1.8000
(227)	LSN	1.0000	30.000	30.000	0.	20.000	8.0000	3.5000	7.0000	1.7000
(232)	LSN	1.0000	50.000	48.000	12.500	24.500	20.000	7.0000	12.000	6.2000
(279)	LSN	2.0000	34.000	32.000	0.	18.000	18.000	3.0000	11.000	1.8000
(309)	LSN	3.0000	22.000	20.000	0.	14.000	14.000	3.0000	8.0000	8.0000

ROSEGATE

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(1)	RSG	1.0000	28.000	28.000	1.0000	22.000	9.0000	3.0000	8.5000	1.3000
(5)	RSG	1.0000	20.500	20.500	3.0000	20.000	7.5000	3.0000	7.0000	.90000
(6)	RSG	1.0000	38.000	38.000	3.0000	19.000	9.5000	4.0000	8.5000	1.9000
(8)	RSG	1.0000	31.000	31.000	7.0000	18.500	10.000	3.5000	9.0000	1.6000
(9)	RSG	1.0000	25.500	25.500	5.0000	16.000	7.0000	3.0000	7.0000	1.1000
(10)	RSG	4.0000	20.000	20.000	.50000	18.000	5.5000	2.5000	5.5000	1.0000
(13)	RSG	1.0000	38.000	36.000	6.0000	13.000	6.0000	5.0000	4.5000	2.0000
(18)	RSG	4.0000	35.000	33.000	7.5000	10.000	9.0000	4.5000	5.0000	-0.
(19)	RSG	1.0000	27.000	27.000	0.	19.500	8.0000	3.5000	7.5000	1.7000
(24)	RSG	1.0000	32.000	32.000	4.0000	15.000	6.0000	4.0000	5.5000	1.4000
(25)	RSG	1.0000	26.000	26.000	3.5000	16.000	5.5000	3.5000	4.5000	1.3000
(26)	RSG	1.0000	24.000	24.000	3.0000	17.000	4.5000	4.5000	4.5000	1.3000
(28)	RSG	1.0000	36.000	36.000	3.0000	16.000	6.0000	4.0000	5.5000	-0.
(29)	RSG	1.0000	34.000	33.500	4.0000	16.000	9.0000	4.5000	8.0000	2.1000

HUMBOLDT

0	9	10	11	13	14	15	16	18	19	20
(217)	0.	0.	0.	BIF	N	CHL	Y	.87000	0.	1.0000

LARGE SIDE NOTCH

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(14)	50.000	120.00	175.00	BIF	N	OBS	U	1.0000	.23611	.52632
(103)	25.000	180.00	180.00	BIF	N	OBS	N	.90476	0.	1.0000
(188)	25.000	180.00	180.00	BIF	N	OBS	Y	1.0000	-0.	-0.
(227)	40.000	120.00	190.00	BIF	N	CHL	N	1.0000	0.	.40000
(232)	30.000	150.00	160.00	BIF	N	OBS	U	.96000	.25000	.81633
(279)	10.000	180.00	170.00	UNI	N	CHL	N	.94118	0.	1.0000
(309)	40.000	200.00	175.00	BIF	N	CHL	N	.90909	0.	1.0000

ROSEGATE

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(1)	35.000	125.00	90.000	BIF	Y	CHH	N	1.0000	.35714 -1	.40909
(5)	30.000	130.00	100.00	BIF	N	CHL	Y	1.0000	.14634	.37500
(6)	40.000	150.00	100.00	BIF	N	CHL	Y	1.0000	.78947 -1	.50000
(8)	35.000	160.00	115.00	UNI	N	CHH	N	1.0000	.22581	.54054
(9)	90.000	180.00	90.000	UNI	N	CHH	N	1.0000	.19608	.43750
(10)	-0.	-0.	120.00	UNI	N	CHL	U	1.0000	.25000 -1	.28947
(13)	55.000	175.00	110.00	BIF	N	OBS	N	1.0000	.16667	.46154
(18)	70.000	200.00	130.00	BIF	N	OBS	U	.94286	.21429	.90000
(19)	30.000	110.00	90.000	BIF	N	CHL	U	1.0000	0.	.41026
(24)	40.000	160.00	95.000	BIF	N	OBS	Y	1.0000	.12500	.40000
(25)	60.000	180.00	100.00	BIF	N	CHL	N	1.0000	.13462	.34375
(26)	35.000	130.00	95.000	BIF	N	OBS	Y	1.0000	.12500	.26471
(28)	30.000	110.00	90.000	BIF	N	OBS	U	1.0000	.83333 -1	.37500
(29)	30.000	125.00	95.000	BIF	N	CHL	N	.98529	.11765	.56250

0	17	1	2	3	4	5	6	7	8	12
(30)	RSG	1.0000	27.500	27.500	2.0000	17.000	6.0000	3.0000	6.5000	1.2000
(37)	RSG	1.0000	28.000	28.000	2.5000	17.500	7.0000	3.0000	7.0000	1.3000
(38)	RSG	4.0000	39.500	39.500	13.500	13.000	10.000	3.5000	9.5000	2.0000
(39)	RSG	1.0000	25.000	25.000	4.0000	18.000	9.0000	3.0000	9.0000	1.2000
(40)	RSG	1.0000	30.000	30.000	1.5000	16.500	7.0000	4.0000	7.0000	1.8000
(41)	RSG	1.0000	16.500	15.000	4.5000	10.500	5.0000	2.5000	5.0000	.40000
(43)	RSG	1.0000	17.500	15.500	5.5000	12.000	7.5000	3.0000	6.0000	4.0000
(44)	RSG	1.0000	29.500	29.500	6.0000	16.500	9.0000	3.5000	7.5000	1.5000
(48)	RSG	1.0000	27.000	27.000	3.5000	17.000	6.5000	5.0000	6.0000	1.9000
(50)	RSG	1.0000	26.000	26.000	2.5000	18.000	9.0000	2.5000	9.0000	1.2000
(51)	RSG	1.0000	35.000	34.000	4.5000	16.000	10.000	5.0000	7.5000	2.1000
(52)	RSG	1.0000	26.500	26.500	7.0000	13.000	8.5000	5.0000	6.0000	1.4000
(54)	RSG	1.0000	42.000	42.000	5.5000	15.500	10.000	4.0000	9.0000	1.9000
(61)	RSG	1.0000	24.000	24.000	5.0000	17.000	7.0000	2.5000	6.0000	1.0000
(63)	RSG	1.0000	30.500	30.500	6.5000	7.0000	6.5000	3.0000	6.0000	1.6000
(65)	RSG	1.0000	23.000	23.000	2.5000	15.500	5.5000	3.0000	4.5000	1.1000
(66)	RSG	1.0000	30.500	30.500	4.5000	16.000	8.0000	3.0000	6.0000	1.4000
(68)	RSG	1.0000	20.000	20.000	4.0000	14.500	7.5000	3.0000	5.5000	.60000
(71)	RSG	1.0000	15.500	14.500	5.5000	9.0000	8.0000	2.5000	5.5000	.40000
(74)	RSG	1.0000	34.000	34.000	6.5000	15.000	8.0000	4.5000	7.5000	2.0000
(80)	RSG	1.0000	19.500	19.500	5.5000	14.000	6.5000	2.5000	6.0000	.60000
(81)	RSG	1.0000	16.000	15.500	5.0000	8.5000	5.5000	3.0000	4.0000	.40000
(96)	RSG	1.0000	35.000	35.000	2.0000	24.000	10.000	3.0000	10.000	2.0000
(106)	RSG	4.0000	33.000	33.000	1.0000	19.500	10.000	-0.	9.0000	-0.
(107)	RSG	4.0000	30.500	30.500	2.0000	19.500	7.0000	-0.	7.0000	-0.
(108)	RSG	4.0000	31.500	31.500	2.0000	20.000	9.0000	-0.	9.0000	-0.
(109)	RSG	4.0000	34.000	34.000	3.0000	21.500	6.0000	-0.	6.0000	-0.
(110)	RSG	4.0000	37.000	37.000	5.5000	15.000	8.0000	-0.	7.0000	-0.
(114)	RSG	1.0000	63.000	63.000	1.0000	20.500	9.0000	-0.	8.5000	-0.
(115)	RSG	1.0000	43.000	43.000	1.0000	29.000	9.0000	-0.	8.5000	-0.

ROSEGATE

0	9	10	11	13	14	15	16	18	19	20
(30)	40.000	130.00	90.000	BIF	N	OBS	N	1.0000	.72727 -1	.35294
(37)	40.000	140.00	90.000	UNI	Y	CHA	U	1.0000	.89286 -1	.40000
(38)	-0.	-0.	90.000	BIF	N	CHA	N	1.0000	.34177	.76923
(39)	50.000	140.00	95.000	BIF	Y	CHL	U	1.0000	.16000	.50000
(40)	35.000	130.00	90.000	BIF	N	CHL	U	1.0000	.50000 -1	.42424
(41)	20.000	140.00	100.00	UNI	N	OBS	N	.90909	.27273	.47619
(43)	45.000	155.00	110.00	BIF	N	OBS	N	.88571	.31429	.62500
(44)	70.000	170.00	100.00	UNI	N	CHL	N	1.0000	.20339	.54545
(48)	50.000	150.00	90.000	UNI	N	CHH	N	1.0000	.12963	.38235
(50)	55.000	160.00	110.00	UNI	N	CHH	N	1.0000	.96154 -1	.50000
(51)	35.000	160.00	130.00	BIF	N	OBS	U	.97143	.12857	.62500
(52)	95.000	210.00	110.00	BIF	N	OBS	U	1.0000	.26415	.65385
(54)	80.000	180.00	100.00	BIF	N	CHA	Y	1.0000	.13095	.64516
(61)	60.000	160.00	100.00	UNI	N	OBS	N	1.0000	.20833	.41176
(63)	80.000	180.00	90.000	BIF	N	OBS	N	1.0000	.21311	.92857
(65)	50.000	155.00	110.00	UNI	N	CHL	N	1.0000	.10870	.35484
(66)	25.000	140.00	120.00	UNI	Y	CHL	N	1.0000	.14754	.50000 /
(68)	30.000	140.00	115.00	BIF	N	OBS	Y	1.0000	.20000	.51724
(71)	60.000	200.00	130.00	BIF	N	OBS	U	.93548	.35484	.88889
(74)	90.000	180.00	90.000	BIF	N	OBS	N	1.0000	.19118	.53333
(80)	70.000	190.00	100.00	UNI	N	CHH	N	1.0000	.28205	.46429
(81)	70.000	180.00	110.00	BIF	N	OBS	N	.86875	.31250	.64706
(96)	20.000	125.00	100.00	BIF	Y	CHL	N	1.0000	.57143 -1	.41667
(106)	-0.	-0.	-0.	MISS	N	OBS	N	1.0000	.30303 -1	.51282
(107)	-0.	-0.	-0.	MISS	N	BAS	N	1.0000	.65574 -1	.35897
(108)	-0.	-0.	-0.	MISS	N	CHL	N	1.0000	.63492 -1	.45000
(109)	-0.	-0.	-0.	MISS	N	CHL	N	1.0000	.88235 -1	.27907
(110)	-0.	-0.	-0.	MISS	N	OBS	N	1.0000	.14865	.53333
(114)	20.000	100.00	130.00	MISS	N	CHH	N	1.0000	.15873 -1	.43902
(115)	25.000	100.00	90.000	MISS	N	CHH	N	1.0000	.23256 -1	.31034

0	17	1	2	3	4	5	6	7	8	12
(116)	RSG	1.0000	49.000	49.000	4.0000	15.000	6.0000	-0.	6.0000	-0.
(118)	RSG	1.0000	30.000	25.000	5.0000	17.000	8.0000	4.0000	8.0000	2.0000
(121)	RSG	1.0000	31.000	31.000	6.0000	13.000	8.0000	4.0000	7.0000	1.0000
(125)	RSG	4.0000	-0.	-0.	5.0000	12.000	9.0000	3.0000	8.0000	.90000
(126)	RSG	4.0000	-0.	-0.	-0.	20.000	-0.	3.5000	7.0000	1.0000
(129)	RSG	1.0000	38.000	.37.000	8.0000	18.000	8.0000	5.5000	7.5000	3.0000
(131)	RSG	1.0000	38.000	37.000	3.0000	9.0000	9.0000	3.5000	8.5000	1.5000
(133)	RSG	4.0000	-0.	-0.	6.0000	15.000	9.5000	5.0000	7.0000	1.0000
(138)	RSG	1.0000	28.500	28.500	6.0000	14.500	6.0000	3.5000	5.5000	1.0000
(141)	RSG	1.0000	35.000	34.000	6.5000	13.000	10.000	4.0000	6.0000	1.4000
(145)	RSG	1.0000	34.000	34.000	4.0000	15.500	10.000	3.0000	8.0000	1.5000
(158)	RSG	1.0000	20.000	20.000	6.0000	18.000	7.5000	3.5000	6.5000	.70000
(160)	RSG	1.0000	27.000	27.000	7.0000	14.000	6.5000	4.5000	6.5000	1.4000
(172)	RSG	1.0000	30.000	30.000	4.0000	12.000	6.5000	3.5000	6.0000	.90000
(183)	RSG	1.0000	29.500	29.500	5.5000	16.500	10.000	3.5000	8.5000	1.2000
(184)	RSG	1.0000	27.000	26.000	6.0000	19.000	9.5000	4.5000	7.5000	1.8000
(186)	RSG	1.0000	23.000	22.000	5.0000	12.000	7.0000	3.5000	6.5000	.70000
(189)	RSG	1.0000	28.000	27.000	8.5000	13.500	9.5000	6.0000	8.0000	2.1000
(192)	RSG	1.0000	38.000	38.000	7.0000	21.500	10.000	5.5000	8.0000	3.0000
(203)	RSG	1.0000	20.000	19.000	5.5000	13.000	7.0000	3.0000	5.5000	.70000
(207)	RSG	1.0000	41.000	41.000	7.0000	12.000	10.000	3.5000	5.5000	1.5000
(216)	RSG	1.0000	29.500	29.500	2.5000	17.600	8.0000	4.0000	7.0000	2.1000
(221)	RSG	1.0000	46.000	44.500	8.5000	19.500	9.0000	6.0000	8.0000	4.2000
(222)	RSG	1.0000	39.000	39.000	6.5000	16.500	7.0000	4.0000	6.5000	2.1000
(224)	RSG	1.0000	36.000	36.000	7.0000	20.000	10.000	6.0000	9.0000	3.9000
(226)	RSG	1.0000	21.000	19.000	0.	10.000	10.000	2.5000	6.5000	.50000
(228)	RSG	1.0000	21.000	21.000	4.0000	18.000	9.5000	8.0000	4.5000	1.2000
(231)	RSG	1.0000	25.500	25.000	5.5000	18.500	7.0000	3.5000	7.0000	1.0000
(237)	RSG	1.0000	27.000	27.000	5.0000	17.000	-0.	3.0000	4.0000	-0.
(247)	RSG	4.0000	-0.	-0.	-0.	13.500	7.5000	5.0000	7.0000	-0.

ROSEGATE

0	9	10	11	13	14	15	16	18	19	20
(116)	50.000	140.00	90.000	MISS	N	CHH	N	1.0000	.81633 -1	.40000
(118)	70.000	150.00	110.00	BIF	N	OBS	N	.83333	.16667	.47059
(121)	70.000	170.00	130.00	BIF	N	OBS	N	1.0000	.19355	.61538
(125)	50.000	165.00	120.00	BIF	N	CHH	Y	-0.	-0.	.75000
(126)	50.000	140.00	110.00	BIF	N	OBS	Y	-0.	-0.	-0.
(129)	90.000	180.00	90.000	BIF	Y	CHL	N	.97368	.21053	.44444
(131)	35.000	135.00	100.00	BIF	N	OBS	N	.97368	.78947 -1	1.0000
(133)	35.000	165.00	125.00	BIF	N	OTH	Y	-0.	-0.	.63333
(138)	40.000	140.00	90.000	BIF	N	OBS	N	1.0000	.21053	.41379
(141)	25.000	160.00	110.00	BIF	N	OBS	U	.97143	.18571	.76923
(145)	15.000	135.00	120.00	BIF	N	CHL	N	1.0000	.11765	.64516
(158)	30.000	140.00	110.00	BIF	N	OBS	Y	1.0000	.30000	.41667
(160)	85.000	190.00	90.000	BIF	N	CHL	N	1.0000	.25926	.46429
(172)	25.000	150.00	120.00	BIF	N	CHL	N	1.0000	.13333	.54167
(183)	40.000	170.00	105.00	BIF	N	OBS	Y	1.0000	.18644	.60606
(184)	50.000	160.00	120.00	BIF	N	CHL	U	.96296	.22222	.50000
(186)	40.000	150.00	105.00	BIF	N	CHL	Y	.95652	.21739	.58333
(189)	100.00	200.00	100.00	BIF	N	CHL	Y	.96429	.30357	.70370
(192)	40.000	140.00	100.00	BIF	N	BAS	N	1.0000	.18421	.46512
(203)	40.000	170.00	120.00	BIF	N	CHL	Y	.95000	.27500	.53846
(207)	20.000	150.00	130.00	BIF	N	CHL	N	1.0000	.17073	.83333
(216)	15.000	130.00	110.00	BIF	N	CHA	Y	1.0000	.84746 -1	.45714
(221)	55.000	155.00	90.000	BIF	N	OTH	N	.96739	.18478	.46154
(222)	65.000	170.00	95.000	BIF	N	CHL	N	1.0000	.16667	.42424
(224)	60.000	150.00	95.000	BIF	N	OBS	U	1.0000	.19444	.50000
(226)	80.000	210.00	120.00	BIF	N	OBS	N	.80476	0.	1.0000
(228)	40.000	150.00	110.00	BIF	N	OBS	Y	1.0000	.19048	.52778
(231)	25.000	140.00	120.00	BIF	N	OBS	Y	.98039	.21569	.37838
(237)	35.000	130.00	100.00	BIF	N	OBS	N	1.0000	.18519	-0.
(247)	70.000	170.00	100.00	BIF	N	OBS	N	-0.	-0.	.55556

0	17	1	2	3	4	5	6	7	8	12
(280)	RSG	2.0000	32.000	32.000	5.0000	12.500	6.0000	4.0000	5.0000	-0.
(317)	RSG	2.0000	23.000	23.000	3.5000	15.000	5.0000	3.0000	4.0000	1.0000

ELKO CORNER NOTCH

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(21)	ECN	1.0000	30.000	30.000	8.0000	21.500	20.500	5.0000	13.000	2.8000
(42)	ECN	1.0000	30.500	29.000	0.	12.000	12.000	3.0000	7.0000	1.0000
(46)	ECN	1.0000	26.500	26.500	6.5000	14.000	12.000	4.0000	8.0000	1.1000
(47)	ECN	1.0000	25.000	25.000	7.0000	16.000	12.000	5.0000	9.0000	1.8000
(67)	ECN	1.0000	20.000	20.000	7.0000	15.000	11.500	3.0000	7.0000	.90000
(69)	ECN	1.0000	27.500	27.500	7.0000	17.000	15.500	4.5000	12.000	2.0000
(82)	ECN	1.0000	48.000	46.000	7.0000	20.000	15.500	3.5000	9.0000	2.7000
(83)	ECN	1.0000	39.500	38.000	4.0000	28.000	14.000	5.0000	10.000	2.4000
(89)	ECN	1.0000	26.500	25.000	7.0000	21.000	15.000	3.5000	11.500	1.9000
(94)	ECN	1.0000	35.500	33.500	4.0000	23.000	13.500	4.5000	9.5000	2.7000
(95)	ECN	1.0000	32.000	32.000	2.5000	21.500	10.500	5.0000	8.0000	2.3000
(97)	ECN	1.0000	30.000	29.000	5.0000	22.000	13.000	5.0000	10.000	2.7000
(104)	ECN	4.0000	54.000	54.000	12.000	22.000	20.500	-0.	16.000	-0.
(105)	ECN	4.0000	35.000	33.000	9.5000	19.000	12.000	-0.	9.5000	-0.
(120)	ECN	1.0000	33.000	33.000	8.0000	21.000	21.000	5.0000	12.000	3.0000
(134)	ECN	1.0000	26.000	25.000	6.0000	21.000	11.000	3.5000	9.0000	1.0000
(136)	ECN	1.0000	37.000	37.000	13.500	22.000	14.500	5.5000	11.000	3.5000
(159)	ECN	4.0000	-0.	-0.	10.500	27.000	18.500	5.5000	15.500	3.5000
(162)	ECN	1.0000	20.000	19.000	0.	11.000	11.000	3.5000	7.0000	.60000
(165)	ECN	1.0000	25.000	25.000	6.5000	15.000	11.500	4.5000	8.0000	1.1000
(166)	ECN	1.0000	28.000	27.000	7.0000	19.000	16.000	4.0000	9.0000	1.8000
(167)	ECN	1.0000	22.000	22.000	6.0000	11.500	11.000	3.0000	7.0000	.70000
(173)	ECN	4.0000	-0.	-0.	-0.	19.500	19.500	3.0000	10.000	1.6000
(180)	ECN	1.0000	27.500	26.000	0.	10.500	10.500	3.0000	7.0000	.90000

ROSEGATE

0	9	10	11	13	14	15	16	18	19	20
(280)	40.000	160.00	110.00	BIF	N	CHL	N	1.0000	.15625	.48000
(317)	45.000	140.00	100.00	BIF	N	CHL	N	1.0000	.15217	.33333

ELKO CORNER NOTCH

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(21)	30.000	170.00	135.00	UNI	N	OBS	Y	1.0000	.26667	.95349
(42)	70.000	200.00	130.00	BIF	N	OBS	N	.95082	0.	1.0000
(46)	40.000	170.00	130.00	BIF	N	OBS	N	1.0000	.24528	.85714
(47)	75.000	190.00	110.00	BIF	N	OBS	U	1.0000	.28000	.75000
(67)	50.000	190.00	130.00	UNI	N	OBS	Y	1.0000	.35000	.76667
(69)	50.000	180.00	150.00	UNI	N	OBS	U	1.0000	.25455	.91176
(82)	35.000	150.00	130.00	BIF	Y	CHL	Y	.95833	.14583	.77500
(83)	30.000	140.00	120.00	BIF	N	OBS	Y	.96203	.10127	.50000
(89)	40.000	170.00	130.00	UNI	N	OBS	Y	.94340	.26415	.71429
(94)	35.000	140.00	110.00	BIF	N	CHH	N	.94366	.11268	.58696
(95)	25.000	130.00	110.00	BIF	N	CHL	N	1.0000	.78125 -1	.48837
(97)	25.000	130.00	110.00	BIF	Y	CHA	Y	.96667	.16667	.59091
(104)	-0.	-0.	-0.	MISS	N	OBS	Y	1.0000	.22222	.93182
(105)	-0.	-0.	-0.	MISS	N	BAS	N	.94286	.27143	.63158
(120)	30.000	160.00	140.00	BIF	N	OBS	N	1.0000	.24242	1.0000
(134)	30.000	140.00	110.00	BIF	N	OBS	N	.96154	.23077	.52381
(136)	45.000	160.00	110.00	BIF	N	BAS	Y	1.0000	.36486	.65909
(159)	80.000	185.00	110.00	BIF	N	OBS	Y	-0.	-0.	.68519
(162)	30.000	180.00	150.00	BIF	N	OBS	N	.95000	0.	1.0000
(165)	40.000	180.00	140.00	BIF	N	OBS	Y	1.0000	.26000	.76667
(166)	40.000	170.00	130.00	BIF	N	OBS	Y	.96429	.25000	.84211
(167)	55.000	190.00	130.00	BIF	N	OBS	N	1.0000	27273	.95652
(173)	45.000	180.00	130.00	UNI	N	CHH	Y	-0.	-0.	1.0000
(180)	45.000	190.00	130.00	BIF	N	BAS	N	.94545	0.	1.0000

0	17	1	2	3	4	5	6	7	8	12
(185)	ECN	1.0000	28.500	28.500	-0.	-0.	15.000	6.0000	9.5000	2.0000
(196)	ECN	1.0000	28.000	28.000	8.5000	15.000	13.500	3.5000	10.000	1.5000
(208)	ECN	1.0000	36.000	35.000	9.0000	25.500	11.000	7.0000	10.500	3.6000
(210)	ECN	1.0000	30.000	30.000	4.0000	17.000	11.000	4.5000	8.5000	1.8000
(212)	ECN	1.0000	32.000	32.000	7.5000	15.000	11.500	4.5000	8.5000	2.5000
(213)	ECN	1.0000	54.500	52.000	13.000	26.000	21.000	4.0000	14.000	7.0000
(218)	ECN	1.0000	57.000	55.000	4.0000	28.500	17.000	4.5000	12.500	6.0000
(225)	ECN	1.0000	26.000	25.000	0.	18.000	18.000	4.5000	14.000	2.0000
(229)	ECN	1.0000	26.500	25.000	7.0000	17.000	12.500	4.5000	9.0000	1.4000
(233)	ECN	4.0000	-0.	-0.	12.000	27.000	21.000	8.0000	16.000	-0.
(243)	ECN	4.0000	-0.	-0.	-0.	21.000	-0.	6.0000	10.000	1.6000
(310)	ECN	3.0000	-0.	-0.	6.0000	23.000	14.500	5.0000	10.000	-0.

ELKO EARED

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(2)	EEE	4.0000	32.000	27.000	16.000	24.000	16.000	6.5000	13.000	3.8000
(84)	EEE	1.0000	44.000	41.000	7.0000	26.500	20.000	6.0000	15.000	5.4000
(92)	EEE	1.0000	27.000	24.000	4.0000	18.000	11.000	2.0000	8.0000	1.0000
(111)	EEE	1.0000	36.500	34.500	11.000	23.000	19.000	-0.	13.000	-0.
(127)	EEE	1.0000	46.000	43.000	8.0000	26.000	19.000	7.0000	14.000	6.5000
(132)	EEE	1.0000	30.000	28.000	7.0000	24.000	15.000	5.0000	13.500	3.0000
(148)	EEE	1.0000	66.000	60.000	9.0000	31.000	22.000	7.0000	17.000	8.7000
(168)	EEE	1.0000	23.000	20.000	0.	13.000	13.000	4.0000	10.000	1.3000
(195)	EEE	3.0000	-0.	-0.	5.0000	19.000	12.000	3.0000	7.5000	-0.
(219)	EEE	1.0000	67.000	49.000	8.0000	20.500	19.000	6.0000	14.500	7.0000
(220)	EEE	1.0000	42.000	42.000	5.0000	17.000	11.000	4.0000	6.5000	2.3000
(230)	EEE	1.0000	38.000	35.500	10.500	22.000	14.000	5.5000	11.500	4.3000
(234)	EEE	4.0000	-0.	-0.	7.0000	20.000	14.000	5.0000	12.000	-0.
(235)	EEE	4.0000	-0.	-0.	4.0000	19.000	12.000	4.0000	8.0000	-0.

ELKO CORNER NOTCH

0	9	10	11	13	14	15	16	18	19	20
(185)	100.00	210.00	130.00	BIF	N	CHL	Y	1.0000	-0.	-0.
(196)	75.000	210.00	120.00	BIF	N	OBS	N	1.0000	.30357	.90000
(208)	70.000	95.000	150.00	BIF	N	OBS	Y	.97222	.25000	.43137
(210)	30.000	160.00	120.00	BIF	N	CHL	N	1.0000	.13333	.64706
(212)	70.000	200.00	120.00	UNI	N	BAS	N	1.0000	.23438	.76667
(213)	30.000	180.00	140.00	UNI	N	CHL	N	.95413	.23853	.80769
(218)	15.000	125.00	110.00	BIF	N	CHA	N	.96491	.70175 -1	.59649
(225)	80.000	210.00	125.00	BIF	N	OBS	U	.96154	0.	1.0000
(229)	60.000	170.00	120.00	BIF	N	OBS	Y	.94340	.26415	.73529
(233)	80.000	185.00	135.00	BIF	N	CHH	N	-0.	-0.	.77778
(243)	50.000	155.00	100.00	BIF	N	OBS	Y	-0.	-0.	-0.
(310)	45.000	170.00	130.00	BIF	N	CHL	U	-0.	-0.	.63043

ELKO EARED

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(2)	-0.	-0.	110.00	BIF	N	OBS	Y	.84375	.50000	.66667
(84)	35.000	160.00	130.00	BIF	N	BAS	N	.93182	.15909	.75472
(92)	35.000	150.00	110.00	UNI	N	CHA	N	.88889	.14815	.61111
(111)	-0.	-0.	-0.	MISS	U	CHL	U	.94521	.30137	.82609
(127)	35.000	155.00	120.00	BIF	N	CHA	N	.93478	.17391	.73077
(132)	25.000	150.00	130.00	BIF	Y	CHL	N	.93333	.23333	.62500
(148)	60.000	160.00	110.00	BIF	N	OBS	Y	.90909	.13636	.70968
(168)	80.000	200.00	120.00	BIF	N	OBS	U	.86957	0.	1.0000
(195)	40.000	150.00	120.00	BIF	N	BAS	Y	-0.	-0.	.63158
(219)	70.000	200.00	120.00	BIF	N	BAS	N	.73134	.11940	.92683
(220)	25.000	150.00	120.00	BIF	N	CHL	Y	1.0000	.11905	.64706
(230)	50.000	180.00	120.00	BIF	N	BAS	N	.93421	.27632	.63636
(234)	45.000	160.00	110.00	BIF	N	CHH	N	-0.	-0.	.70000
(235)	35.000	160.00	120.00	BIF	Y	CHL	N	-0.	-0.	.63158

0	17	1	2	3	4	5	6	7	8	12
(238)	EEE	1.0000	18.000	16.000	8.0000	18.000	11.000	4.0000	7.0000	-0.
(278)	EEE	3.0000	-0.	-0.	8.5000	25.000	22.500	5.5000	20.000	-0.
(306)	EEE	3.0000	-0.	-0.	0.	12.500	12.500	3.0000	9.0000	-0.

GATECLIFF SPLIT STEM

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(3)	GSS	4.0000	28.500	25.500	10.000	19.000	11.000	4.5000	12.000	2.0000
(4)	GSS	1.0000	41.000	36.000	10.000	25.000	14.000	5.5000	12.000	3.9000
(16)	GSS	1.0000	30.000	26.000	0.	11.000	11.000	4.5000	8.0000	1.3000
(27)	GSS	1.0000	27.500	23.000	9.0000	21.000	13.000	5.0000	11.000	1.8000
(35)	GSS	1.0000	27.500	27.000	3.5000	16.000	9.0000	5.0000	10.000	1.8000
(49)	GSS	4.0000	25.500	24.000	10.000	12.000	9.0000	3.0000	-0.	1.0000
(85)	GSS	1.0000	56.000	53.000	3.0000	24.500	14.000	5.0000	10.000	3.1000
(90)	GSS	1.0000	61.000	58.500	7.5000	18.500	11.000	6.0000	10.500	4.9000
(91)	GSS	1.0000	42.000	36.000	6.0000	24.000	16.000	7.0000	16.000	5.4000
(98)	GSS	1.0000	24.000	21.500	4.5000	26.000	14.000	4.5000	11.000	1.6000
(99)	GSS	1.0000	45.000	40.500	11.000	19.500	11.500	5.0000	10.000	3.0000
(117)	GSS	1.0000	37.000	36.000	6.0000	21.000	13.000	3.0000	12.000	2.5000
(130)	GSS	1.0000	45.000	42.000	8.5000	22.000	17.000	5.5000	14.500	4.5000
(143)	GSS	1.0000	33.000	30.000	5.5000	22.000	15.000	6.0000	13.000	3.5000
(163)	GSS	1.0000	28.500	27.500	3.0000	22.000	11.000	5.0000	8.5000	2.0000
(245)	GSS	1.0000	27.000	26.000	9.0000	24.000	24.000	25.000	12.000	2.2000

GATECLIFF CONTRACTING STEM

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(15)	GCS	1.0000	28.500	28.500	1.5000	19.000	6.0000	2.5000	7.0000	1.2000
(23)	GCS	1.0000	27.000	27.000	5.0000	17.500	11.000	4.0000	11.000	-0.
(32)	GCS	1.0000	35.000	35.000	5.5000	18.000	5.0000	4.0000	6.5000	2.1000

ELKO EARED

0	9	10	11	13	14	15	16	18	19	20
(238)	65.000	180.00	140.00	BIF	N	CHL	N	.88889	.44444	.61111
(278)	80.000	190.00	120.00	BIF	N	CHL	U	-0.	-0.	.90000
(306)	90.000	195.00	120.00	BIF	N	OBS	N	-0.	-0.	1.0000

GATECLIFF SPLIT STEM

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(3)	-0.	-0.	100.00	BIF	N	OBS	Y	.89474	.35088	.57895
(4)	60.000	165.00	100.00	BIF	N	OBS	U	.87805	.24390	.56000
(16)	110.00	210.00	100.00	BIF	N	OBS	U	.86667	0.	1.0000
(27)	90.000	190.00	100.00	BIF	N	OBS	Y	.83636	.32727	.61905
(35)	90.000	180.00	90.000	BIF	N	OBS	Y	.98182	.12727	.56250
(49)	-0.	-0.	75.000	UNI	N	CHA	N	.94118	.39216	.75000
(85)	40.000	135.00	105.00	BIF	N	CHL	Y	.94643	.53571 -1	.57143
(90)	110.00	200.00	90.000	BIF	N	OBS	Y	.95902	.12295	.59459
(91)	80.000	170.00	90.000	BIF	N	CHL	Y	.85714	.14286	.66667
(98)	30.000	130.00	100.00	BIF	Y	CHH	Y	.89583	.18750	.53846
(99)	90.000	195.00	95.000	BIF	N	CHL	Y	.90000	.24444	.58974
(117)	60.000	150.00	100.00	UNI	N	CHH	N	.97297	.16216	.61905
(130)	65.000	160.00	95.000	BIF	N	BAS	N	.93333	.18889	.77273
(143)	85.000	175.00	90.000	BIF	N	CHH	N	.90909	.16667	.68182
(163)	30.000	115.00	100.00	BIF	N	OBS	Y	.96491	.10526	.50000
(245)	85.000	180.00	100.00	BIF	Y	CHH	Y	.96296	.33333	1.0000

GATECLIFF CONTRACTING STEM

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(15)	25.000	110.00	85.000	UNI	N	CHL	Y	1.0000	.52632 -1	.31579
(23)	60.000	165.00	100.00	BIF	N	CHL	N	1.0000	.18519	.62857
(32)	80.000	160.00	80.000	BIF	N	OBS	N	1.0000	.15714	.27778

0	17	1	2	3	4	5	6	7	8	12
(34)	GCS	1.0000	27.500	27.500	6.0000	13.000	5.0000	4.0000	4.5000	1.4000
(72)	GCS	1.0000	20.000	20.000	5.5000	20.000	11.000	5.0000	8.0000	1.3000
(100)	GCS	1.0000	23.000	23.000	2.0000	21.000	7.5000	3.0000	6.5000	1.4000
(123)	GCS	1.0000	29.000	29.000	8.0000	14.000	5.0000	5.0000	7.0000	2.0000
(157)	GCS	1.0000	24.000	24.000	7.0000	12.000	3.5000	3.5000	5.0000	-0
(190)	GCS	1.0000	23.000	23.000	4.5000	20.000	8.0000	3.0000	7.5000	1.1000
(191)	GCS	1.0000	29.000	28.000	10.000	24.000	9.0000	6.5000	9.0000	3.5000
(215)	GCS	1.0000	53.500	53.500	10.000	24.000	11.000	5.0000	10.500	5.3000
(302)	GCS	1.0000	20.000	20.000	5.0000	14.000	5.0000	3.0000	5.0000	-0

UNKNOWN

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. VT
(7)	UNK	1.0000	32.000	32.000	8.0000	12.500	11.000	3.5000	8.0000	1.3000
(33)	UNK	1.0000	43.000	42.500	3.0000	17.000	7.0000	4.0000	6.5000	2.4000
(58)	UNK	1.0000	19.500	17.000	6.0000	12.000	10.000	4.0000	9.5000	.90000
(87)	UNK	1.0000	64.000	60.500	10.000	19.000	10.000	6.5000	8.5000	6.1000
(139)	UNK	1.0000	39.500	39.500	15.000	19.000	6.0000	5.0000	0.	3.0000
(142)	UNK	1.0000	40.000	-0.	2.0000	16.000	-0.	3.5000	8.0000	2.5000
(240)	UNK	1.0000	57.000	53.000	0.	19.000	19.000	6.0000	-0.	-0.
(241)	UNK	4.0000	-0	-0.	-0.	25.000	-0.	5.0000	8.0000	-0.
(244)	UNK	4.0000	22.000	-0.	4.0000	14.000	-0.	2.5000	6.5000	-0.
(286)	UNK	3.0000	-0.	-0.	-0.	-0.	12.500	2.0000	7.0000	-0.
(295)	UNK	3.0000	-0.	-0.	-0.	-0.	12.000	2.5000	8.0000	-0.
(299)	UNK	3.0000	-0.	-0.	-0.	-0.	13.000	2.0000	6.0000	-0
(312)	UNK	1.0000	19.000	18.000	6.0000	11.000	-0	2.0000	6.0000	-0.
(338)	UNK	1.0000	14.000	13.000	0.	11.000	11.000	2.0000	4.0000	.30000
(347)	UNK	1.0000	28.000	24.000	0.	12.000	12.000	4.5000	8.0000	1.2000

GATECLIFF CONTRACTING STEM

0	9	10	11	13	14	15	16	18	19	20
(34)	10.000	180.00	90.000	UNI	N	CHL	N	1.0000	.21818	.38462
(72)	30.000	130.00	90.000	BIF	N	OBS	Y	1.0000	.27500	.55000
(100)	30.000	120.00	95.000	BIF	N	CHH	Y	1.0000	.86957 -1	.35714
(123)	140.00	230.00	75.000	BIF	N	OBS	N	1.0000	.27586	.35714
(157)	50.000	140.00	70.000	BIF	Y	OBS	Y	1.0000	.29167	.29167
(190)	75.000	170.00	90.000	UNI	N	CHH	N	1.0000	.19565	.40000
(191)	80.000	180.00	95.000	BIF	N	OBS	Y	.96552	.34483	.37500
(215)	90.000	180.00	90.000	UNI	N	BAS	N	1.0000	.18692	.45833
(302)	80.000	175.00	90.000	BIF	N	OBS	Y	1.0000	.25000	.35714

UNKNOWN

0 CASE#	9. NO	10. DSA	11 PSA	13. TEC	14. HT	15. MAT	16. RECY	18 BIR	19. MWP	20 WBWM
(7)	30.000	200.00	165.00	UNI	N	CHH	N	1.0000	.28125	.88000
(33)	45.000	125.00	85.000	BIF	N	OBS	N	.98837	.69767 -1	.41176
(58)	110.00	100.00	210.00	BIF	N	OBS	Y	.87179	.41026	.83333
(87)	100.00	200.00	105.00	BIF	N	OBS	N	.94531	.15625	.52632
(139)	0.	0.	0.	BIF	N	OBS	N	1.0000	.37975	.40000
(142)	-0.	-0.	-0.	BIF	Y	CHH	N	-0.	.50000 -1	-0
(240)	-0.	145.00	-0.	BIF	N	OBS	N	.92982	0.	1.0000
(241)	-0.	150.00	-0.	BIF	N	OBS	N	-0.	-0.	-0.
(244)	20.000	150.00	140.00	BIF	N	OBS	N	-0.	.18182	-0
(286)	-0.	-0.	170.00	UNI	N	CHL	U	-0	-0.	-0
(295)	-0.	-0.	-0	BIF	N	OBS	U	-0	-0.	-0
(299)	-0	-0.	180.00	BIF	N	OBS	U	-0	-0	-0
(312)	-0.	180.00	-0	BIF	N	OBS	N	.94737	.31579	-0
(338)	35.000	160.00	110.00	BIF	N	OBS	Y	.85714	0	1.0000
(347)	120.00	300.00	120.00	BIF	N	OBS	U	.85714	0	1.0000

0. CASE#	17. TYPE	1. POR	2. LT	3. LA	4. LM	5. WM	6. WB	7. TH	8. WN	12. WT
(17)	CAR	1.0000	15.000	14.500	3.5000	12.000	6.0000	3.5000	5.5000	.50000
(55)	CAR	1.0000	12.500	12.000	4.0000	9.0000	5.0000	3.0000	5.0000	.40000
(56)	CAR	1.0000	13.000	13.000	4.0000	8.0000	4.5000	3.0000	4.5000	.40000
(59)	CAR	1.0000	14.000	14.000	3.5000	8.0000	4.0000	2.5000	4.0000	.40000
(78)	CAR	1.0000	16.000	15.000	5.0000	10.000	6.0000	1.5000	4.5000	.30000
(187)	CAR	1.0000	15.500	15.000	3.0000	10.500	5.0000	3.0000	4.0000	.50000
(199)	CAR	1.0000	12.000	11.000	6.0000	10.500	7.5000	2.0000	6.0000	.40000
(200)	CAR	1.0000	14.500	13.000	3.5000	7.5000	6.0000	5.0000	2.0000	.30000
(201)	CAR	1.0000	11.500	11.000	4.0000	7.0000	4.5000	2.5000	4.0000	.30000
(246)	CAR	1.0000	16.000	15.000	6.0000	11.000	7.0000	3.0000	6.5000	.50000
(337)	CAR	1.0000	14.500	13.500	0.	9.5000	9.5000	3.0000	7.0000	.40000

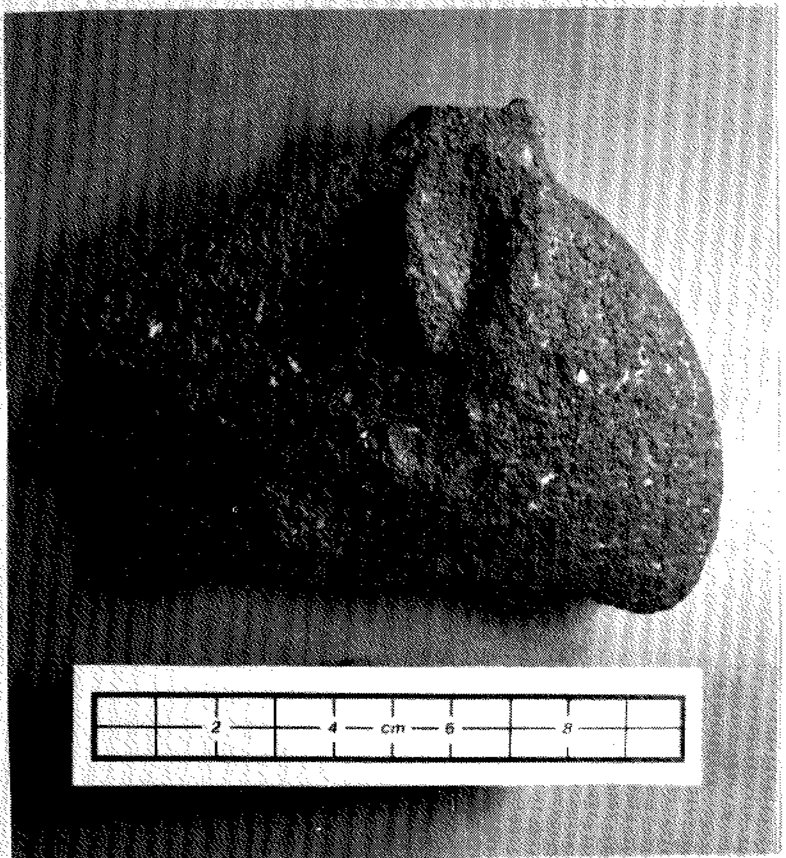
CARSON

0. CASE#	9. NO	10. DSA	11. PSA	13. TEC	14. HT	15. MAT	16. RECY	18. BIR	19. MWP	20. WBWM
(17)	70.000	180.00	105.00	BIF	N	OBS	N	.96667	.23333	.50000
(55)	90.000	180.00	90.000	BIF	N	OBS	N	.96000	.32000	.55556
(56)	100.00	190.00	90.000	BIF	N	OBS	N	1.0000	.30769	.56250
(59)	85.000	175.00	90.000	BIF	N	OBS	N	1.0000	.25000	.50000
(78)	70.000	180.00	110.00	UNI	N	OBS	N	.93750	.31250	.60000
(187)	45.000	165.00	100.00	BIF	N	CHL	N	.96774	.19355	.47619
(199)	100.00	210.00	120.00	UNI	N	OBS	N	.91667	.50000	.71429
(200)	10.000	185.00	180.00	BIF	N	OBS	N	.89655	.24138	.80000
(201)	100.00	200.00	100.00	BIF	N	OBS	N	.95652	.34783	.64286
(246)	80.000	190.00	125.00	BIF	N	OBS	N	.93750	.37500	.63636
(337)	80.000	220.00	120.00	MISS	MISS	MISS	MISS	.93103	0.	1.0000

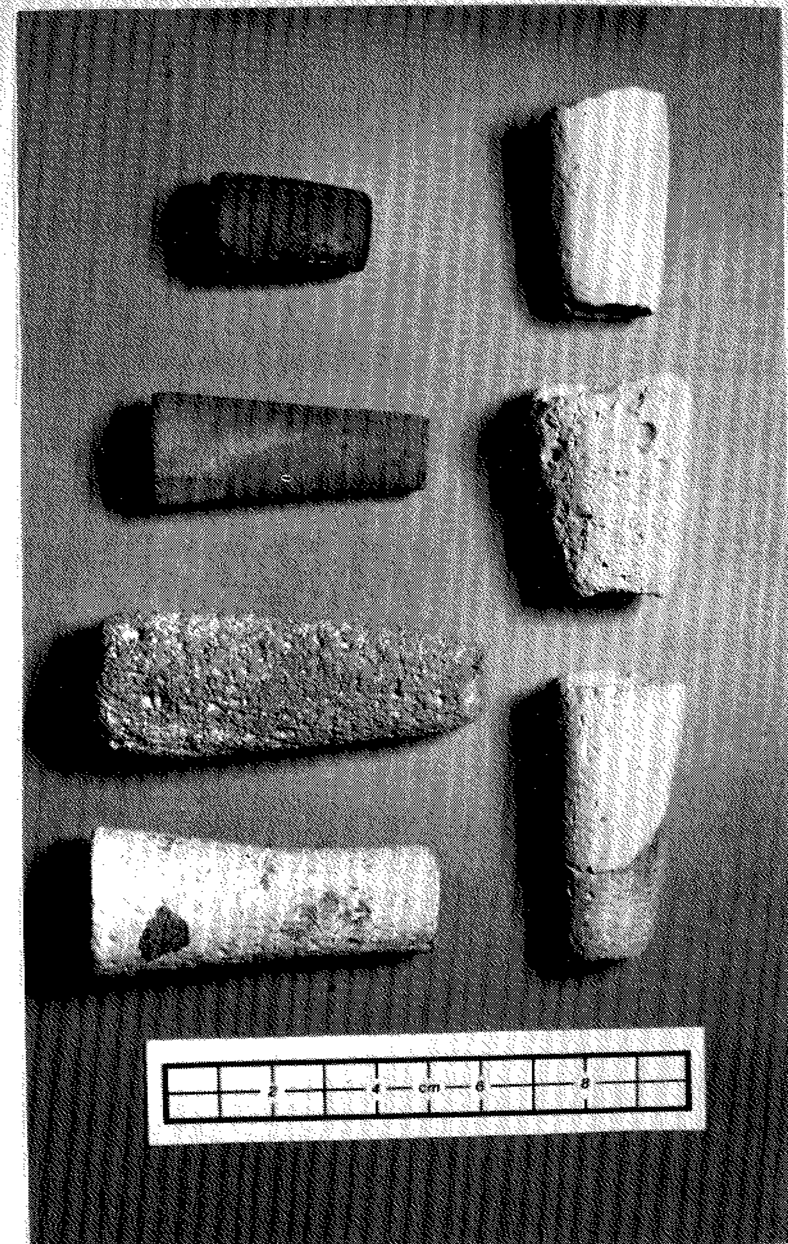
PLATES

(note: scale in all photos is 10 cms. in length)

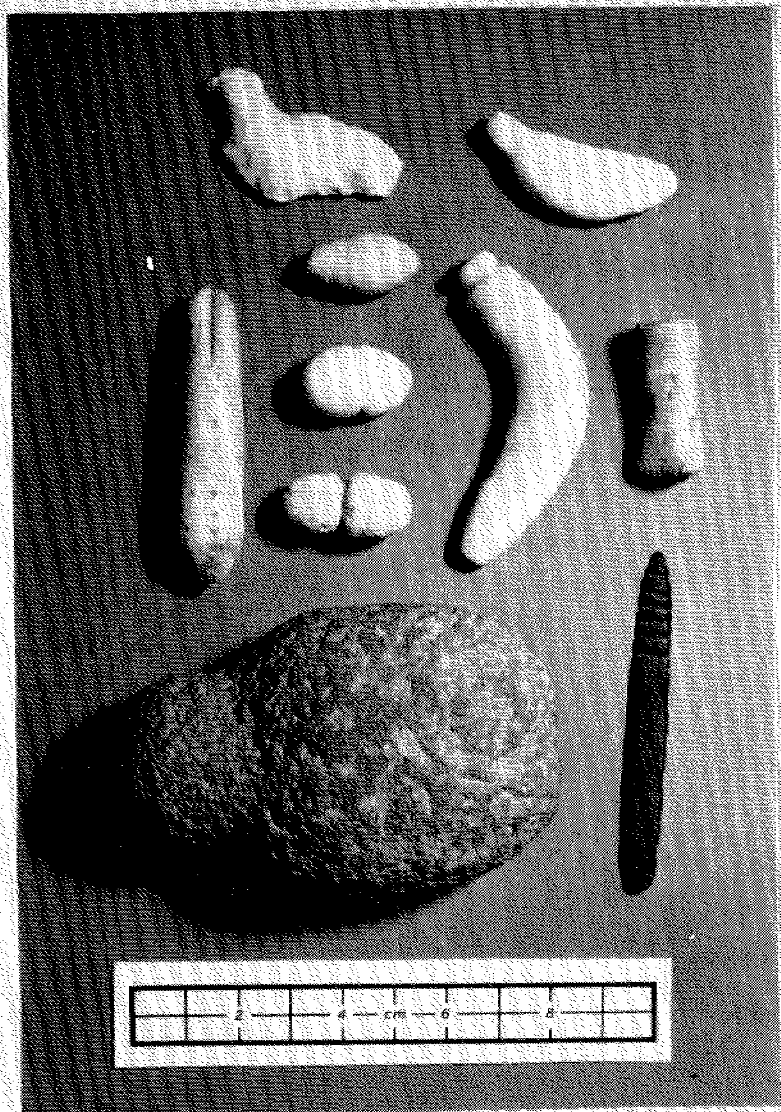
A. groundstone effigy
B. stone pipes
C. stone effigy and "charmstones"
D. stone effigies
E. "sickles"
F. dentalium, stone ring, head to bow drill(?)
G. lapidary drills (?)
H. obsidian eccentrics
I. cached materials (see text)
J. decorated discoidals, stone effigy, groundstone slab
K. bifaces, drill, Humboldt projectile points
L. large bifaces
M. bone tools
N. bone bead manufacturing
O. abalone shell pendant fragments (also 1 piece of porcelain used as ornament, 2 stone pendants)
P. olivella shell beads
Q. Desert Side Notch projectile points
R. two bipolar cores and crude bifaces (items not usually collected)
S. Humboldt projectile points
T. Humboldt projectile points
U. Desert Side Notch and Rosegate projectile points
V. Rosegate projectile points
W. Elko series projectile points
X. Elko and Rosegate series projectile points (some resharpened)
Y. Resharpened projectile points (various types)
Z. Resharpened projectile points (various types)
Aa. Carson projectile points
Bb. Carson projectile points
Cc. mortars and pestles (in rockgarden)
Dd. pestle
Ee. mortar
Ff. mortar
Gg. pestles
Hh. pestle
Ii. metate
Jj. stone bowl (used as mortar)
Kk. rotary motion manos
Ll. back-and-forth motion manos



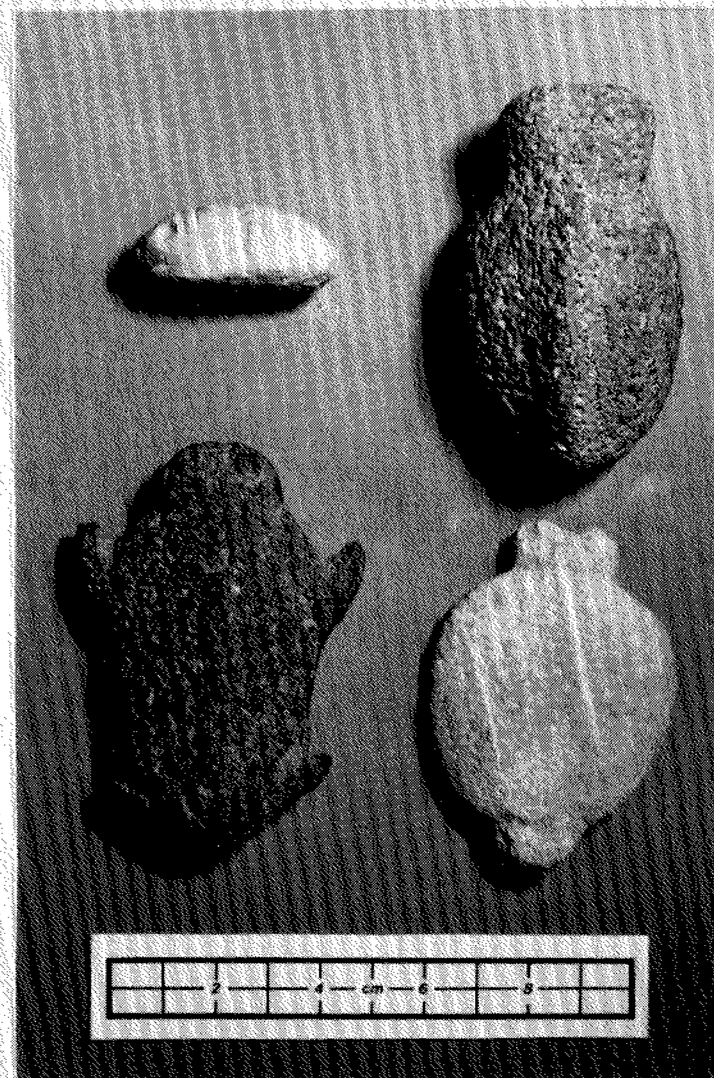
A



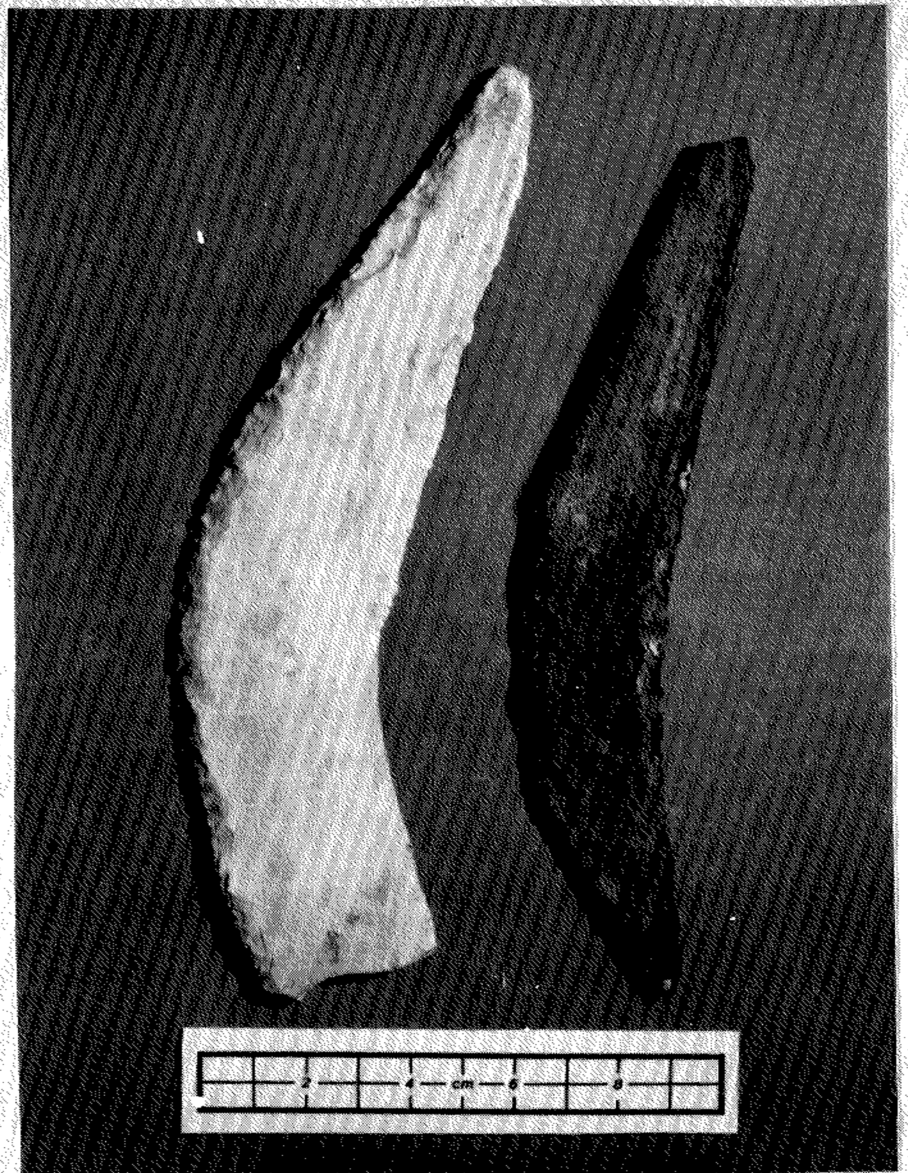
B



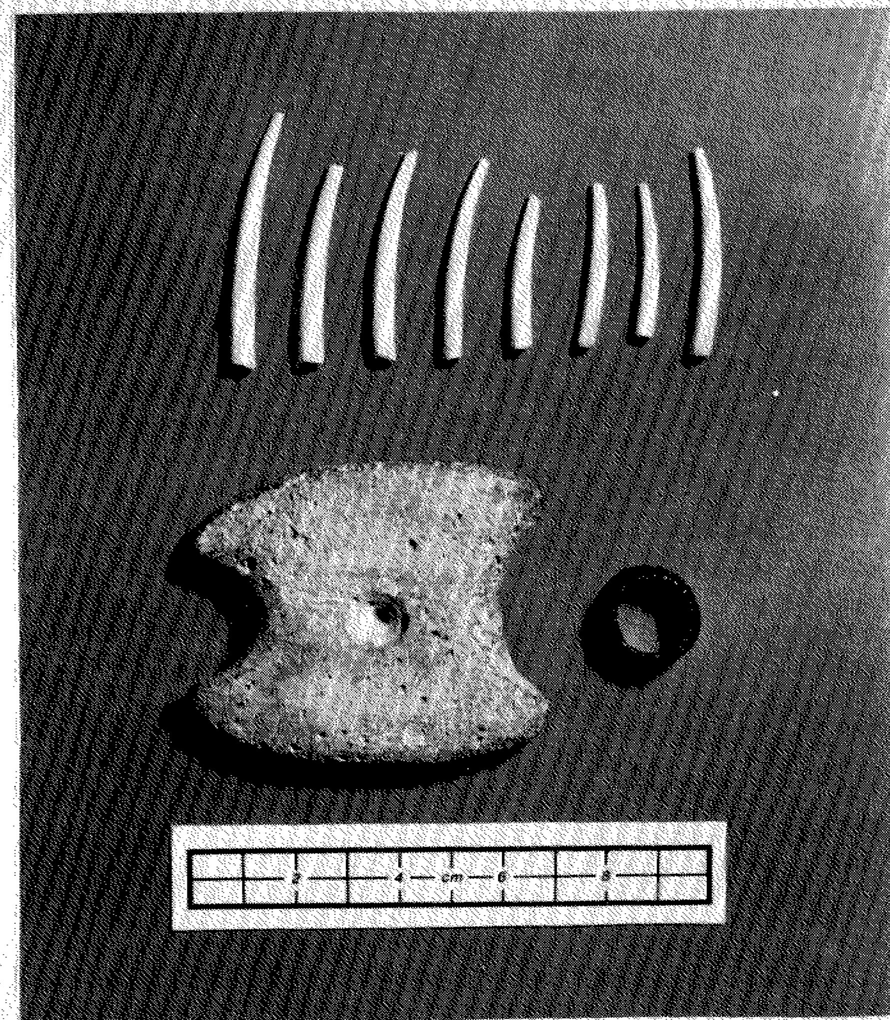
C



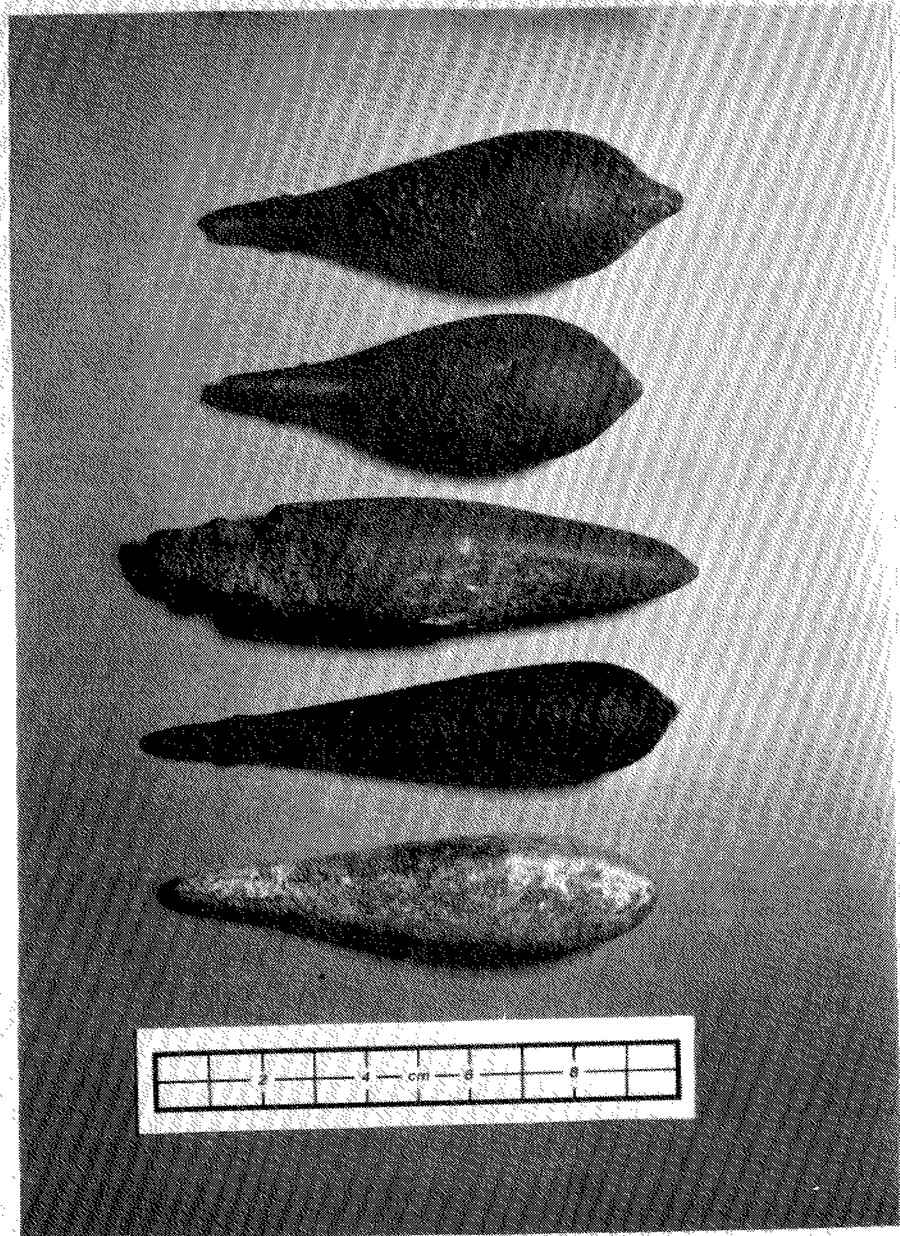
D



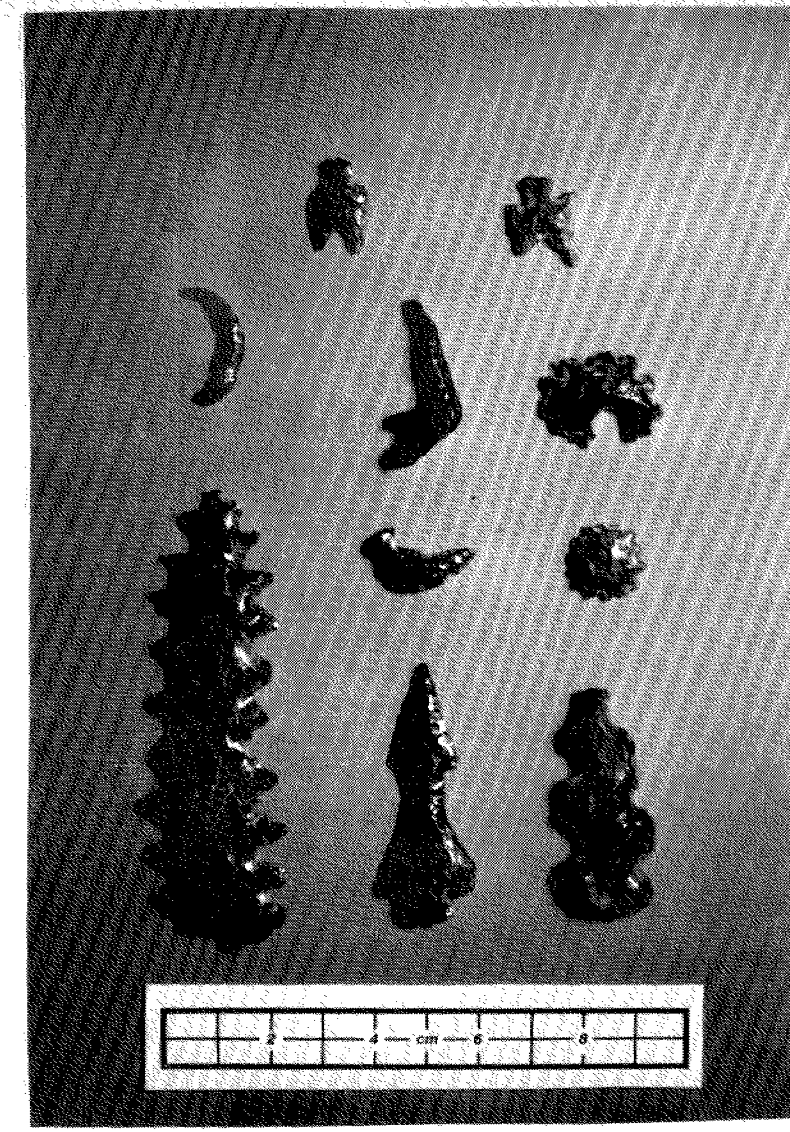
E



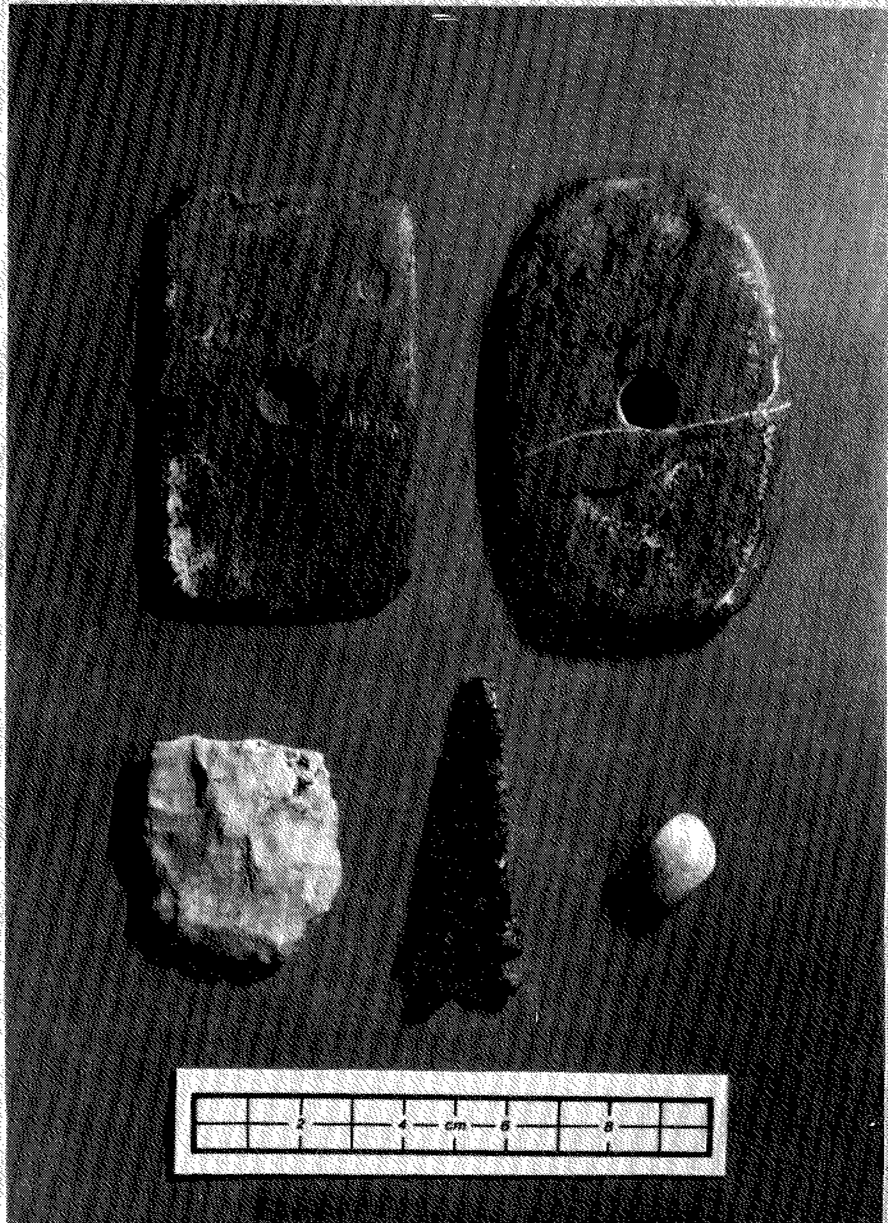
F



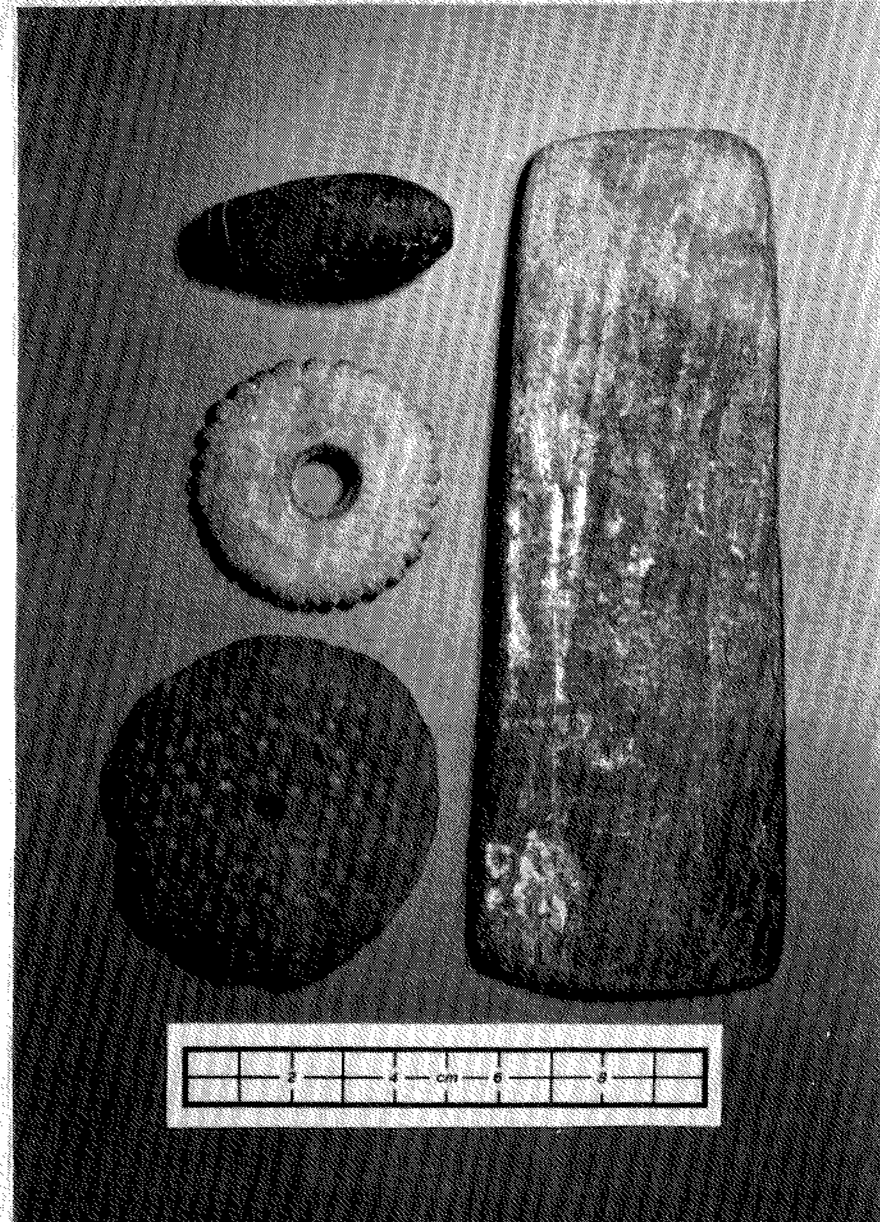
G



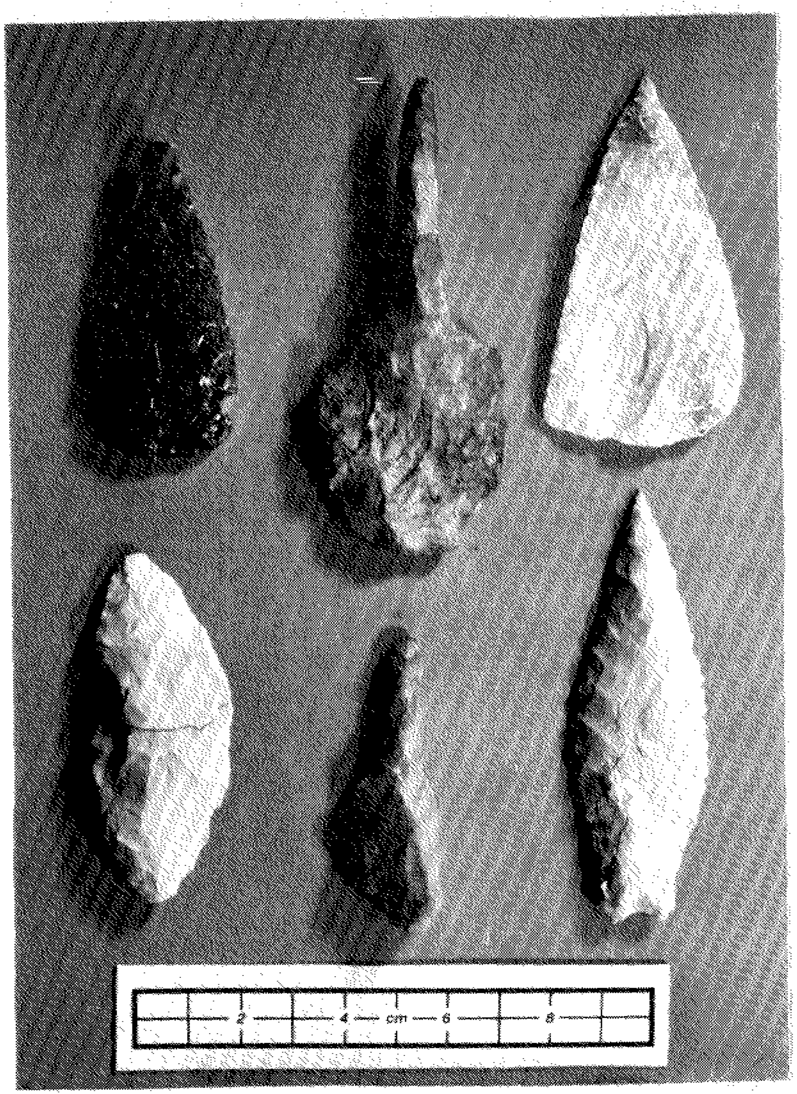
H



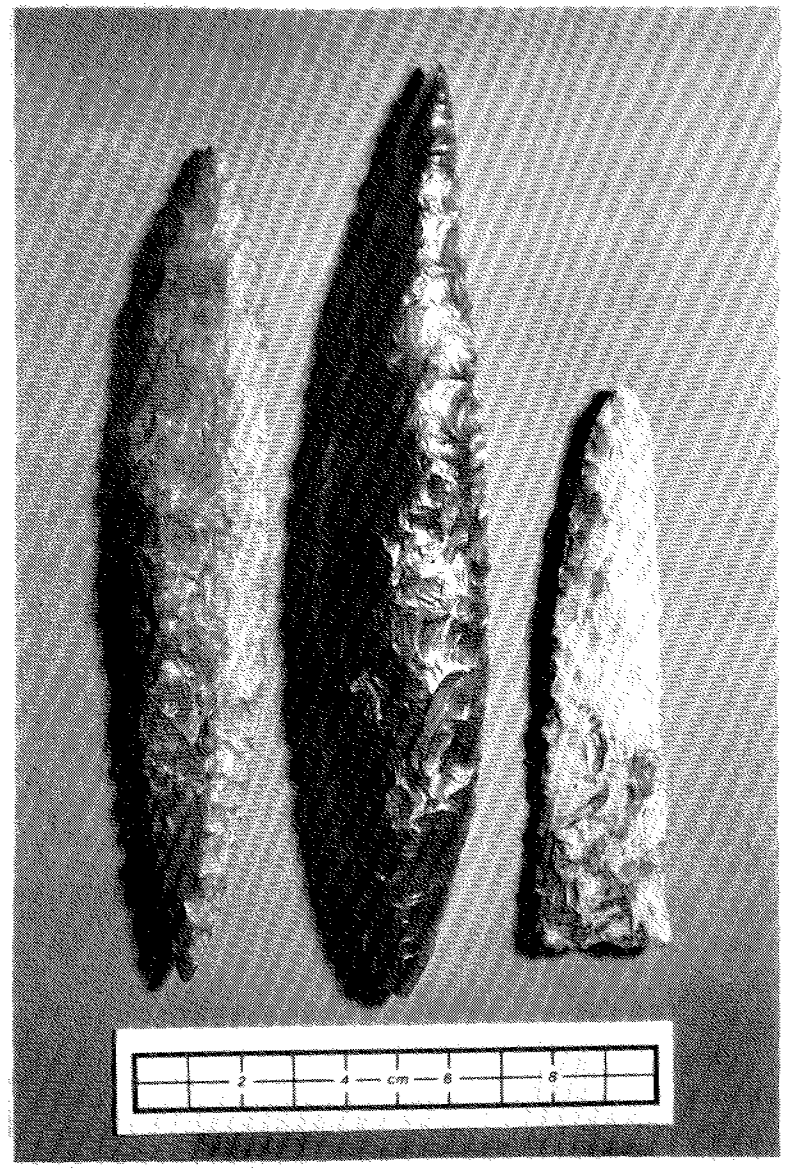
I



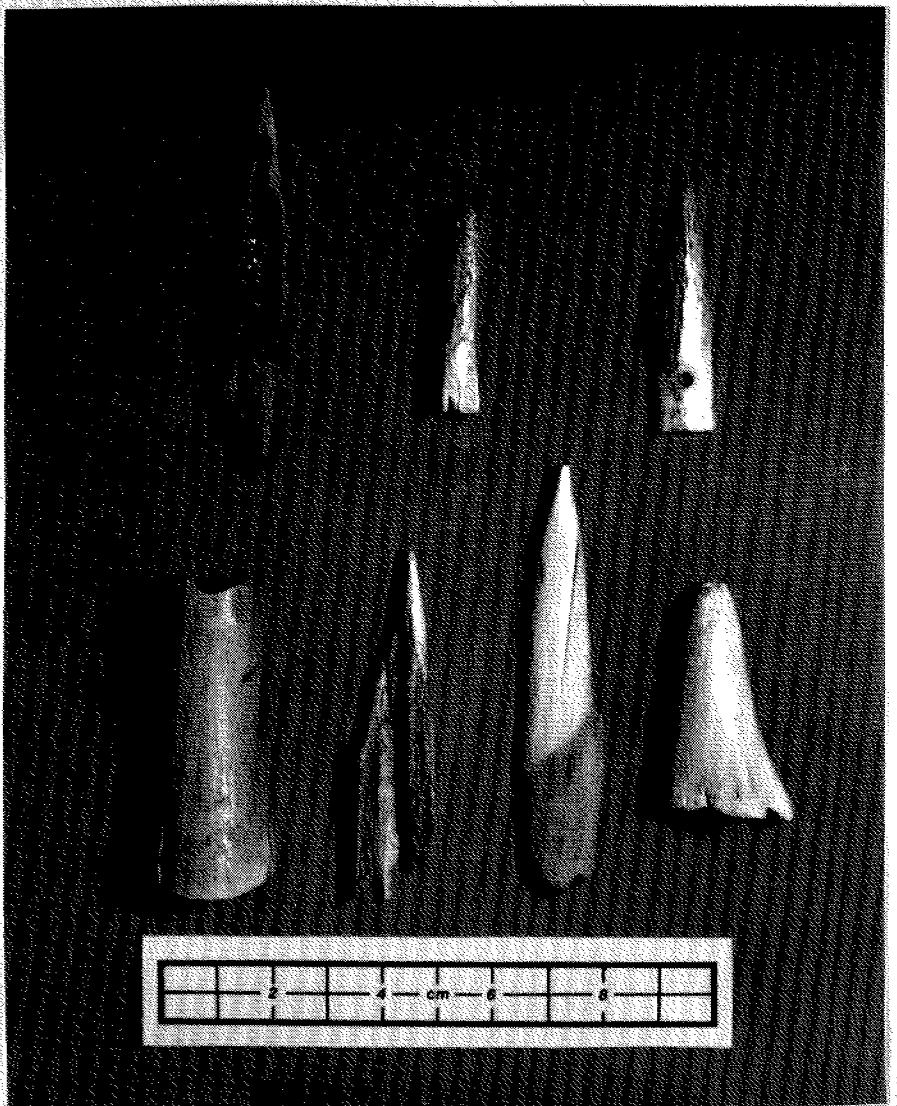
J



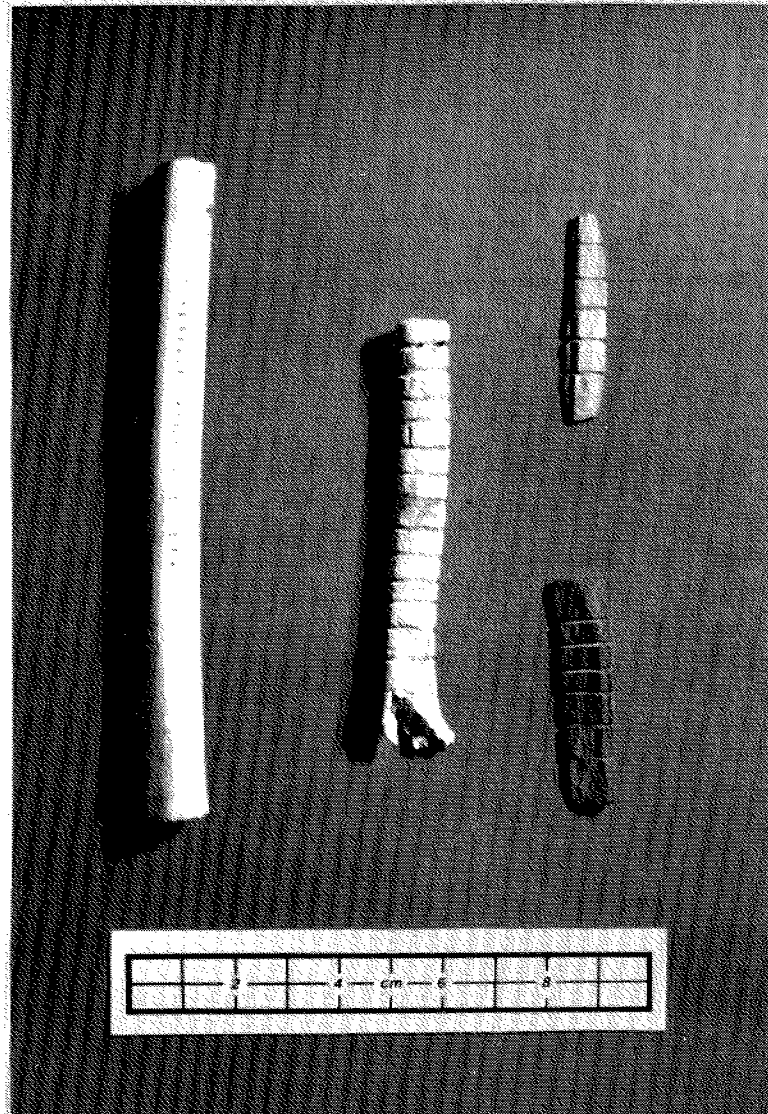
K



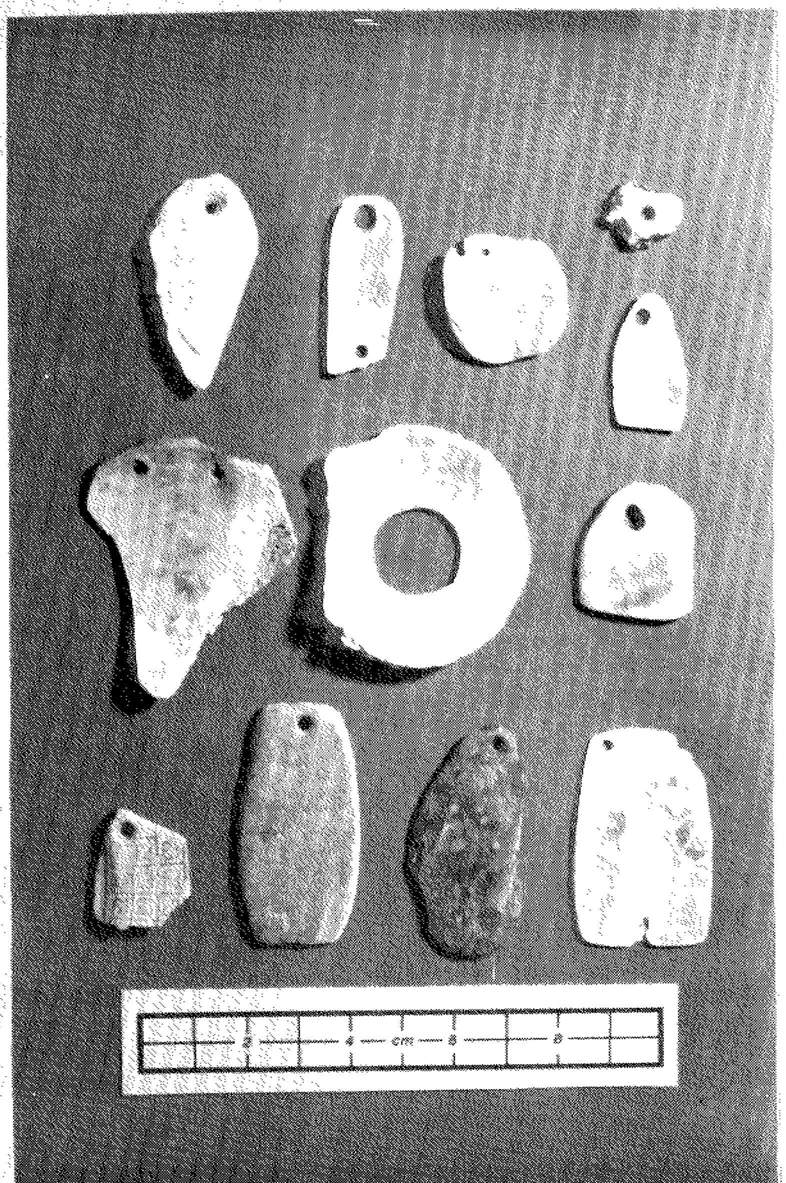
L



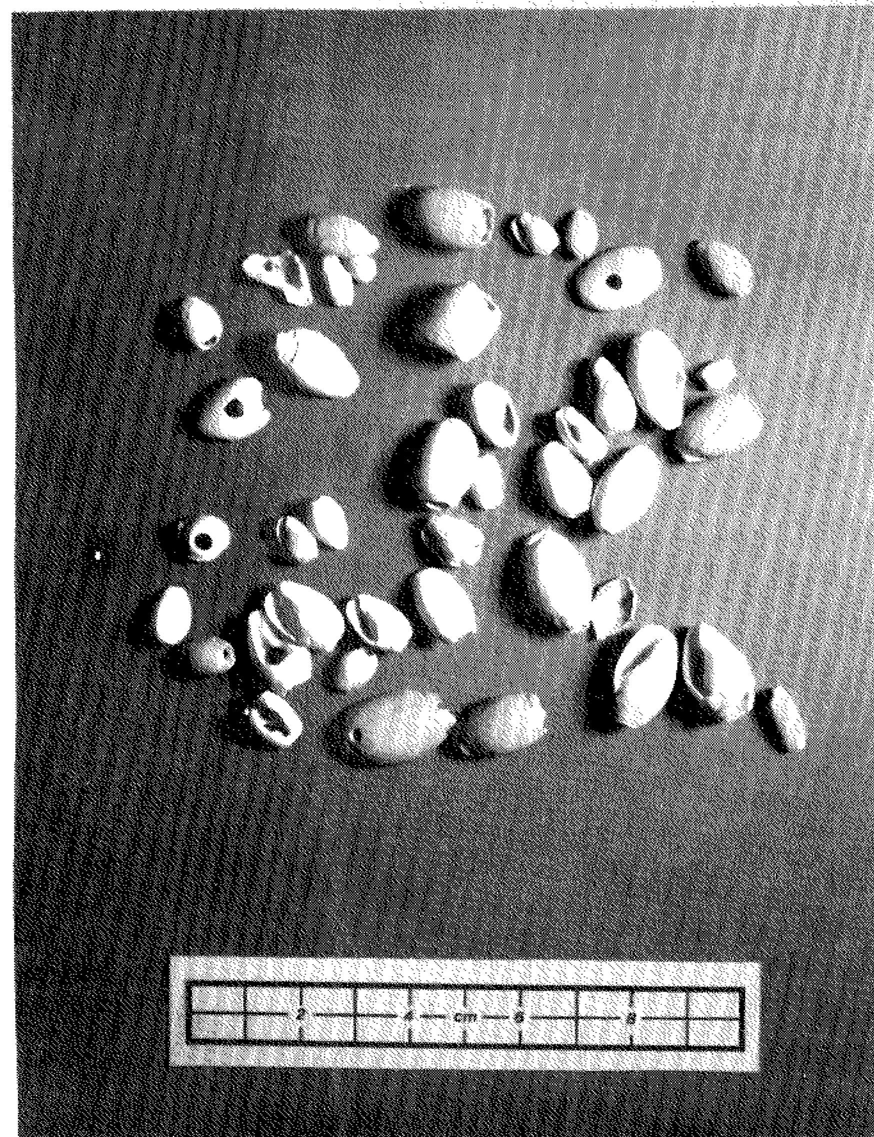
M



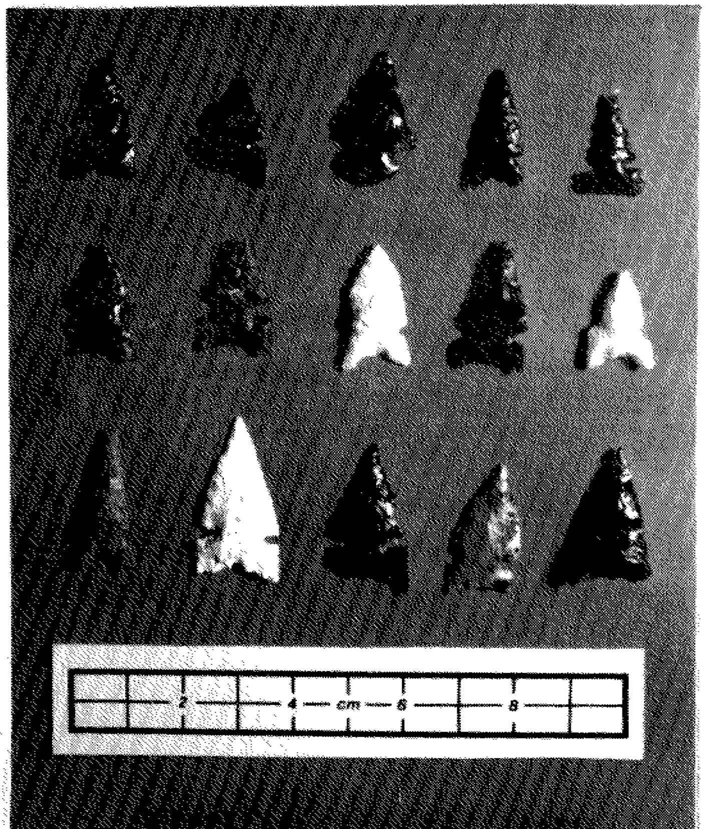
N



O

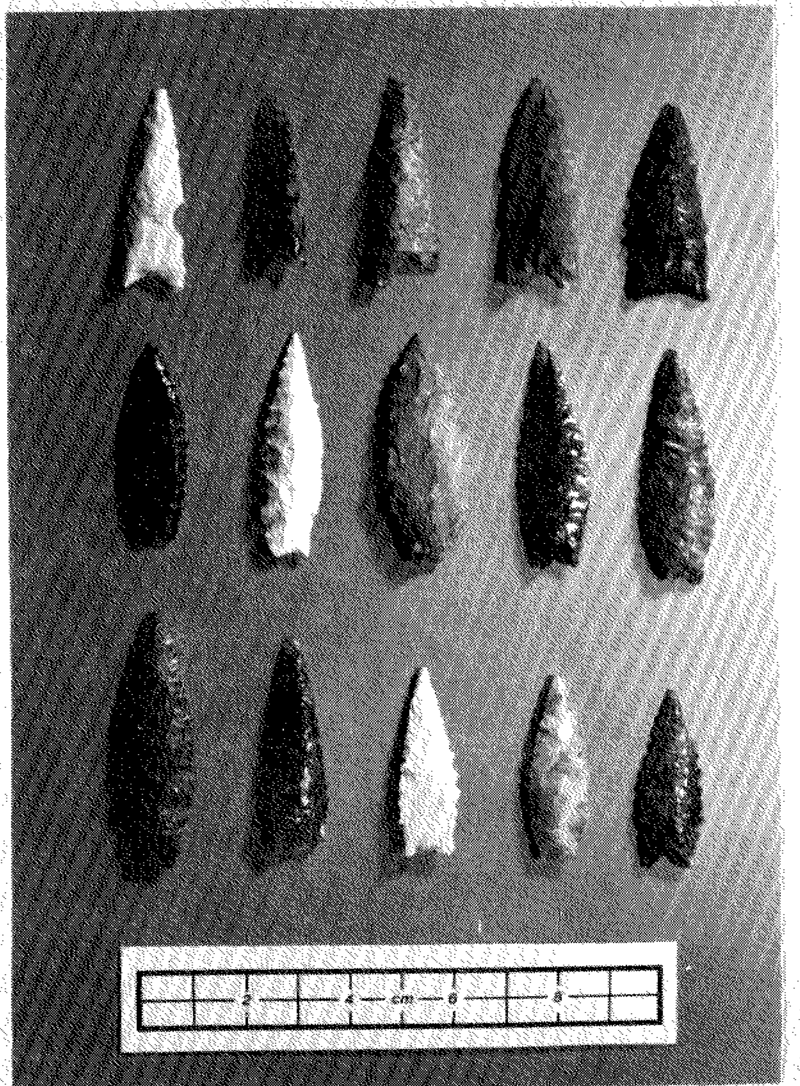


P

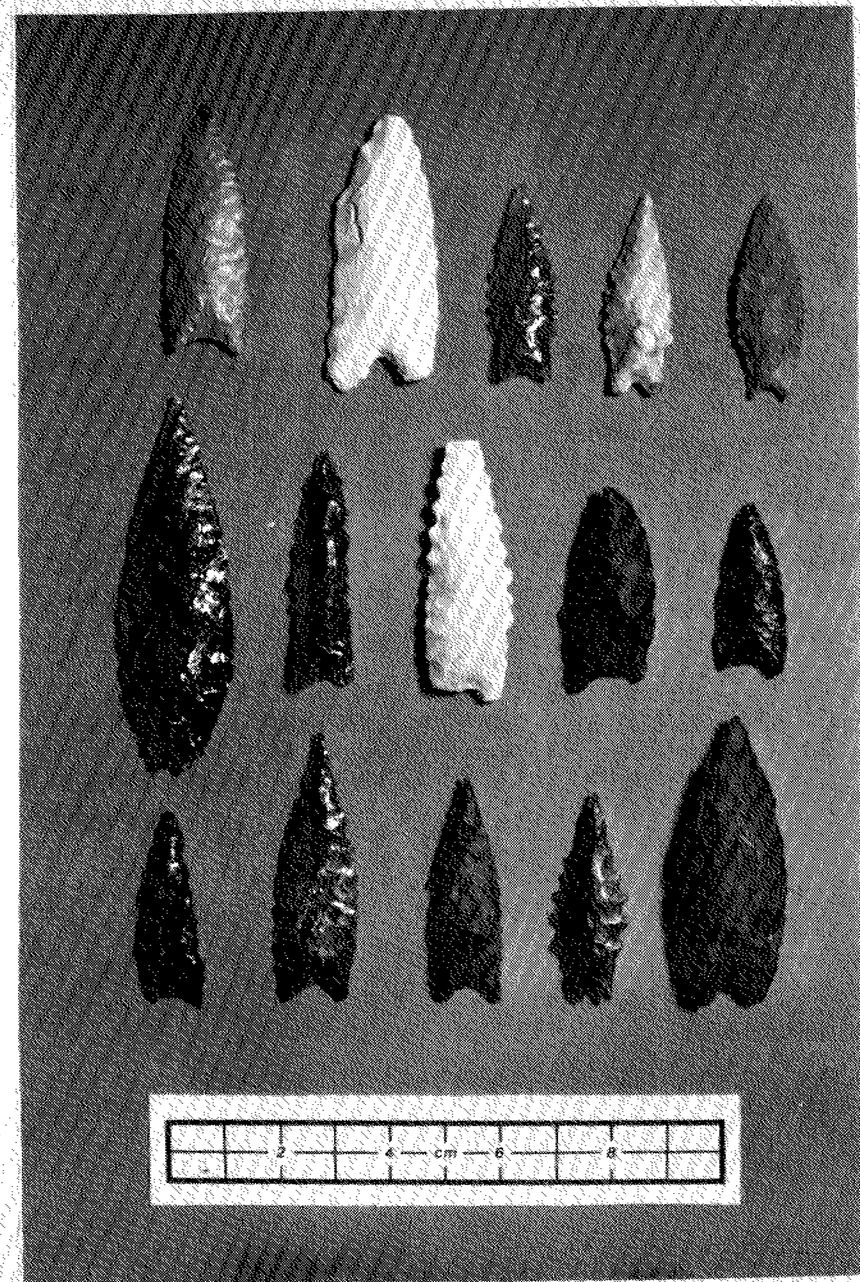


Q

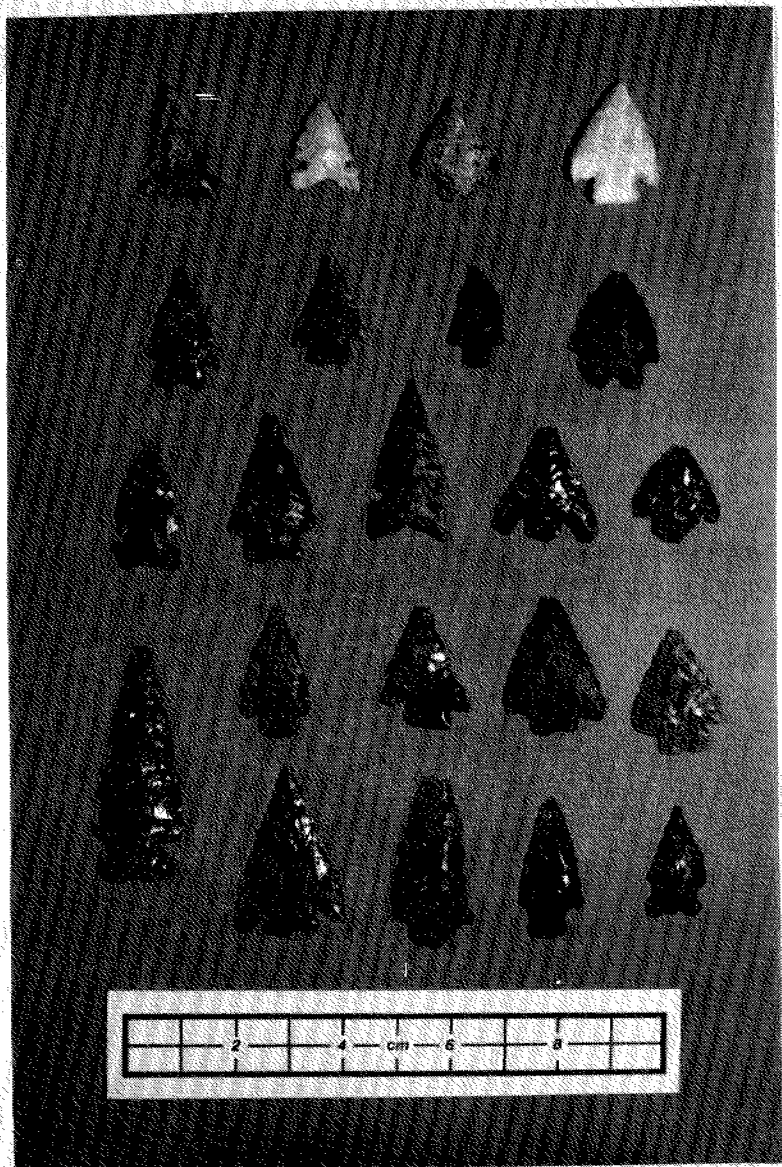
R



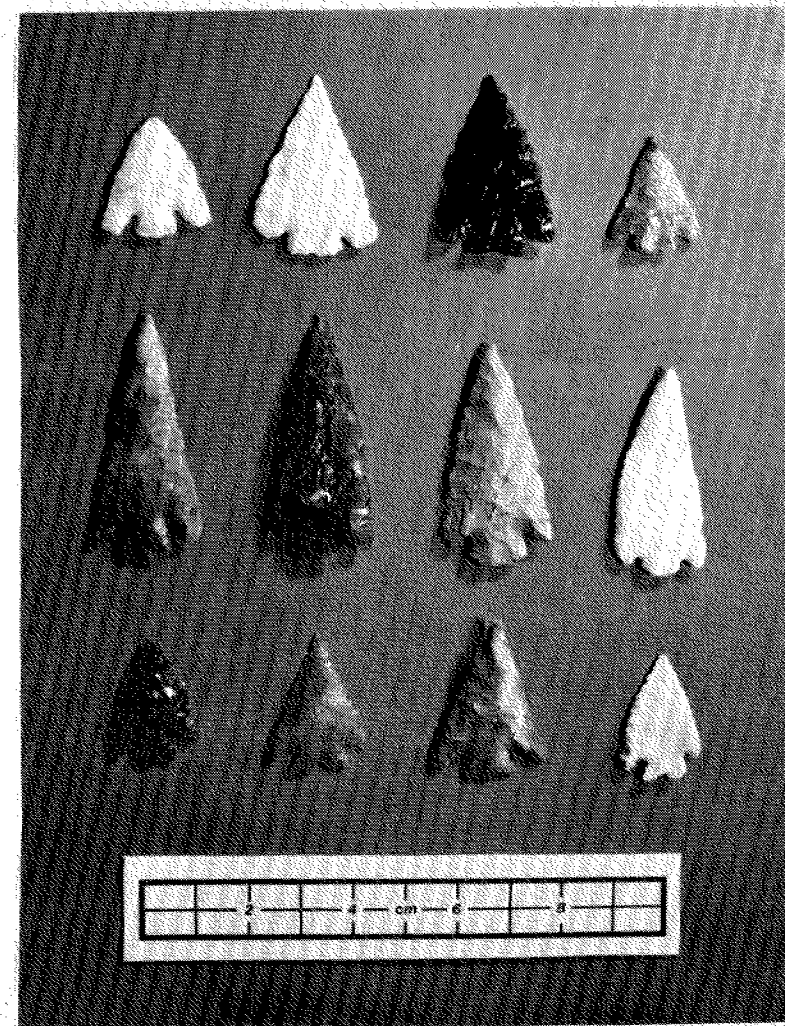
S



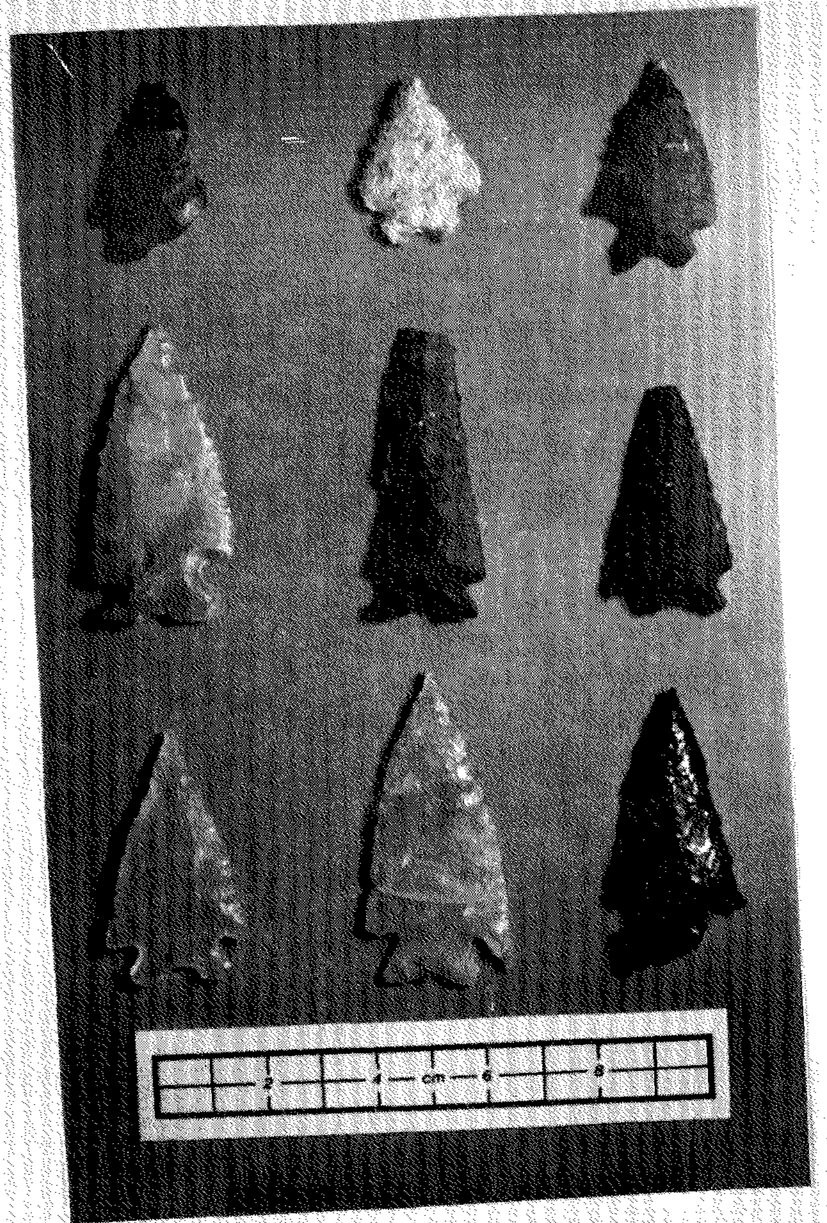
T



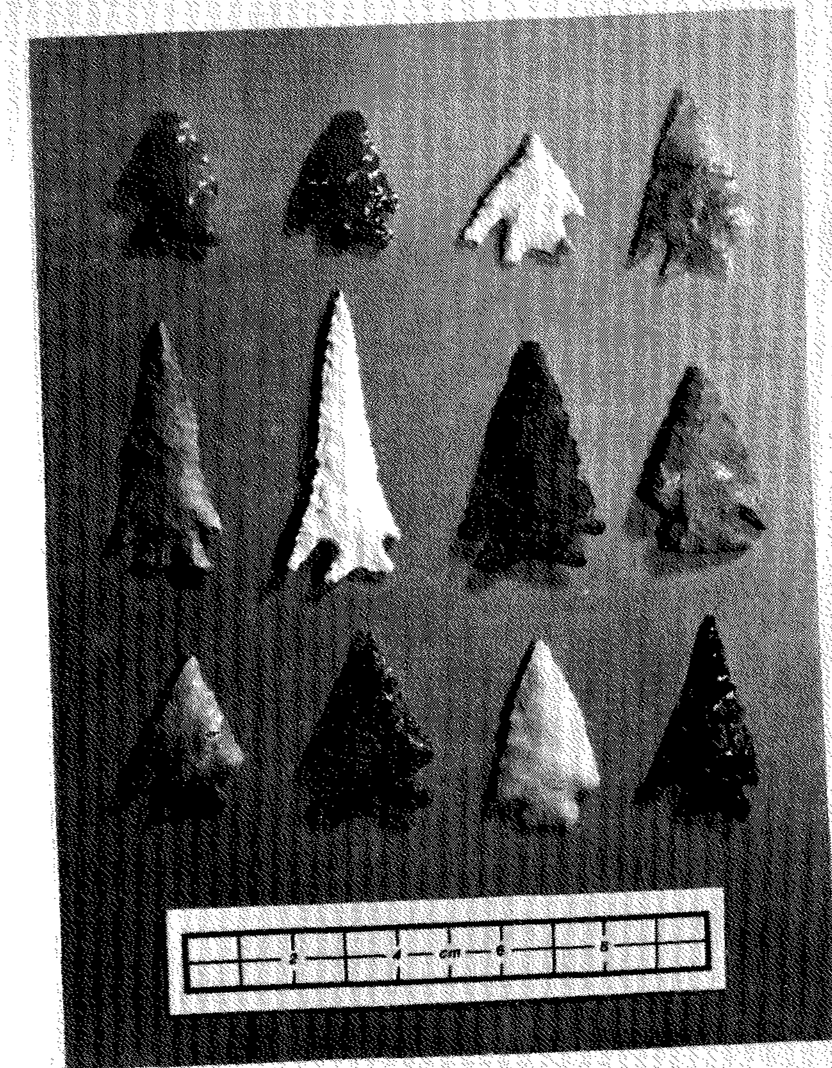
U



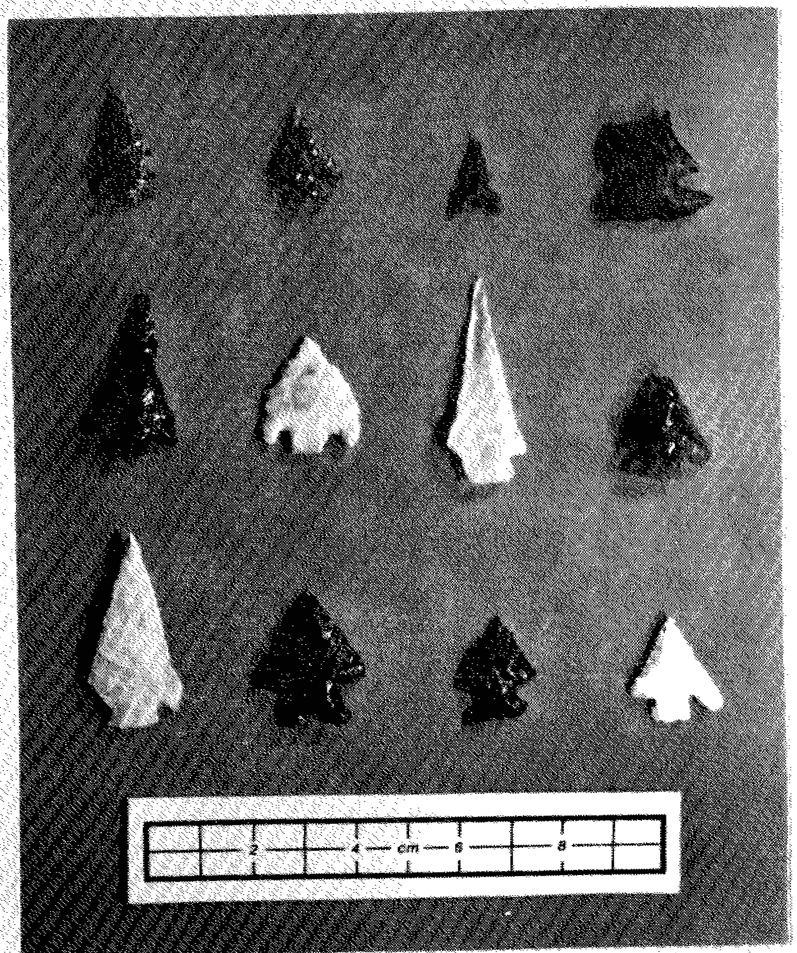
V



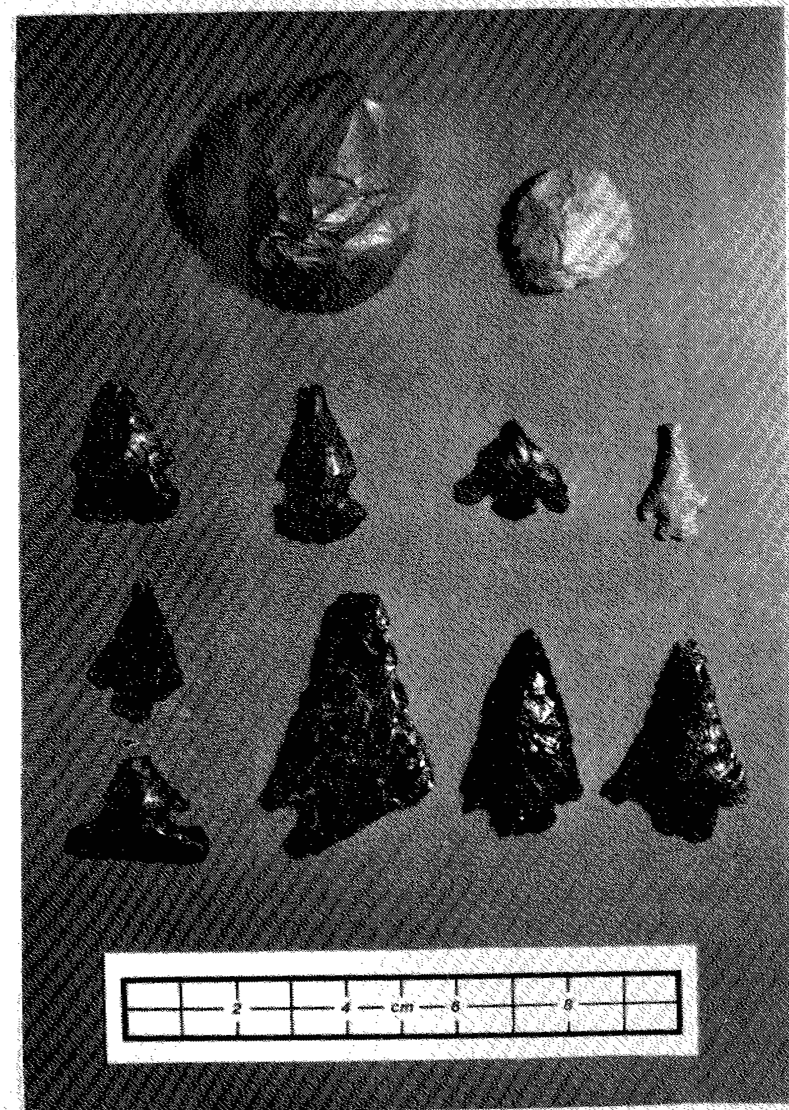
W



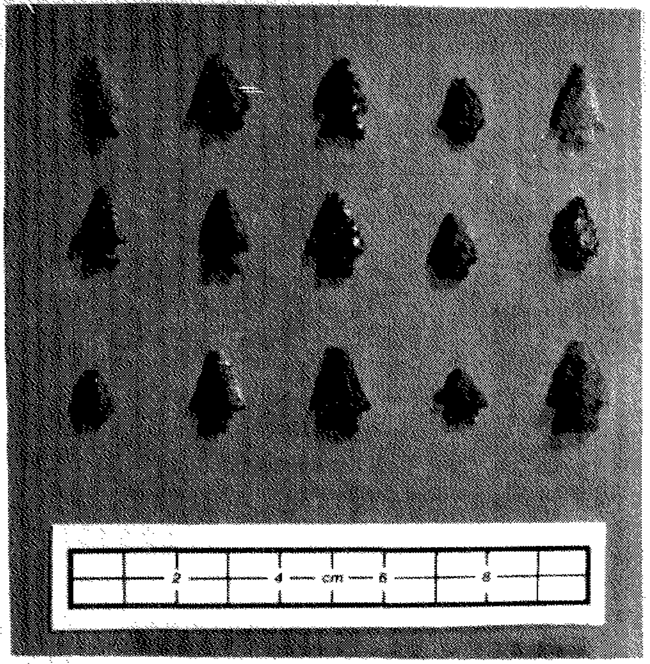
X



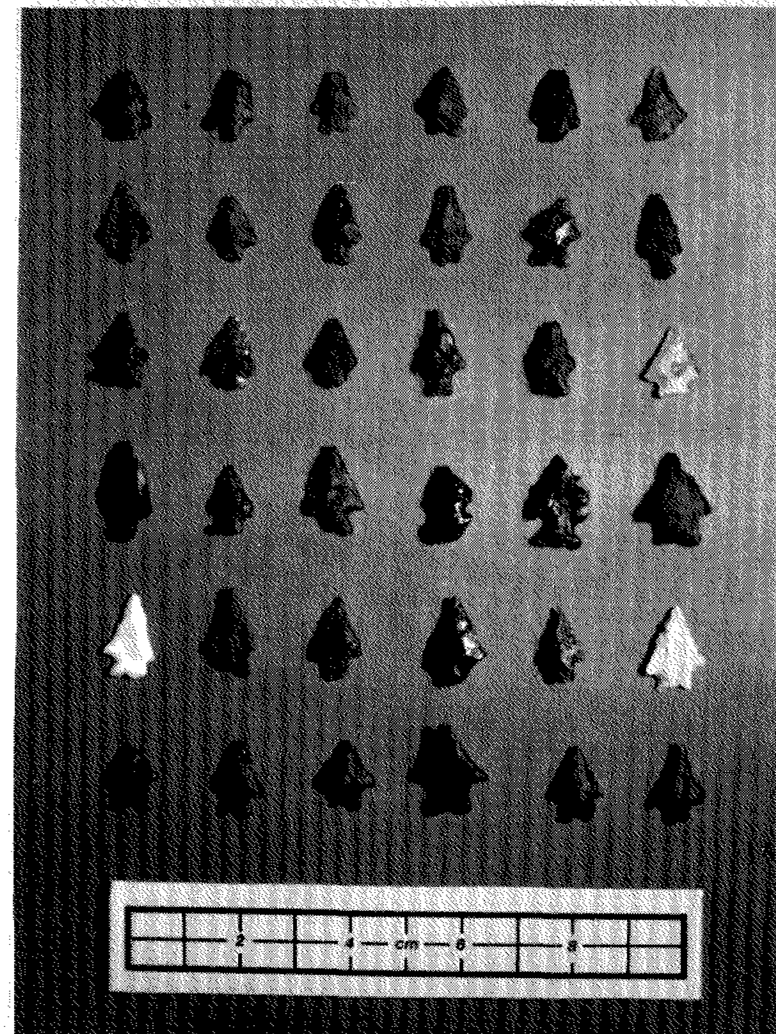
Y



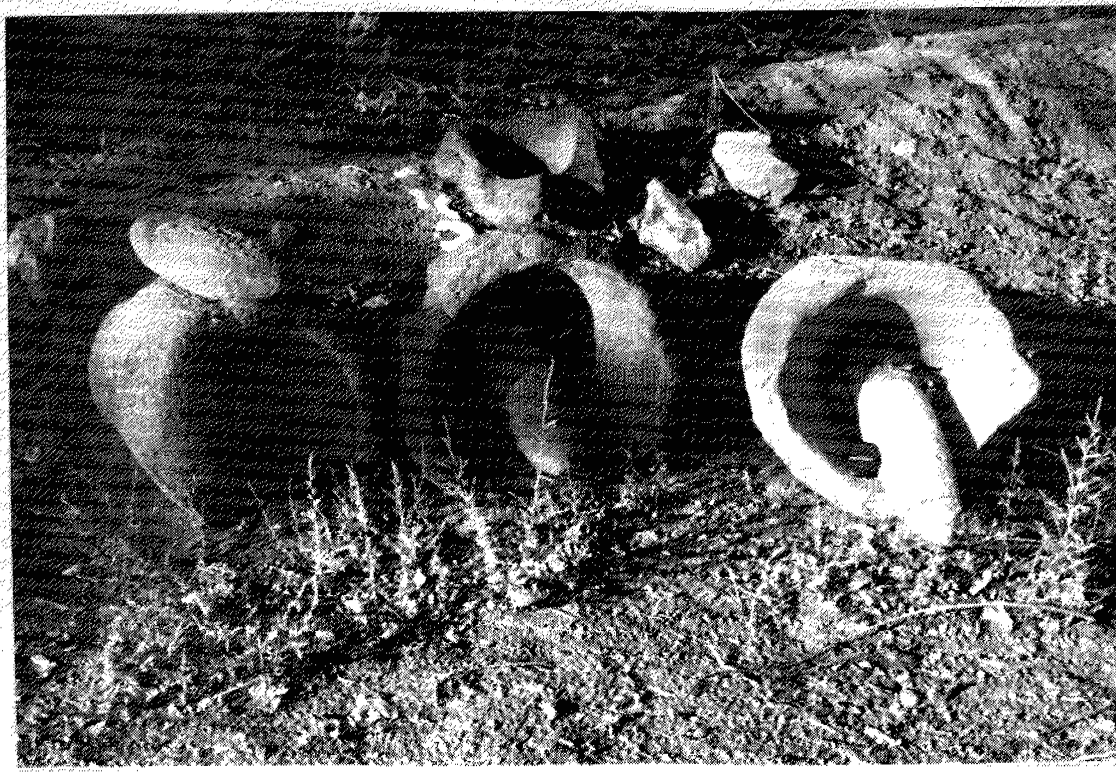
Z



Aa

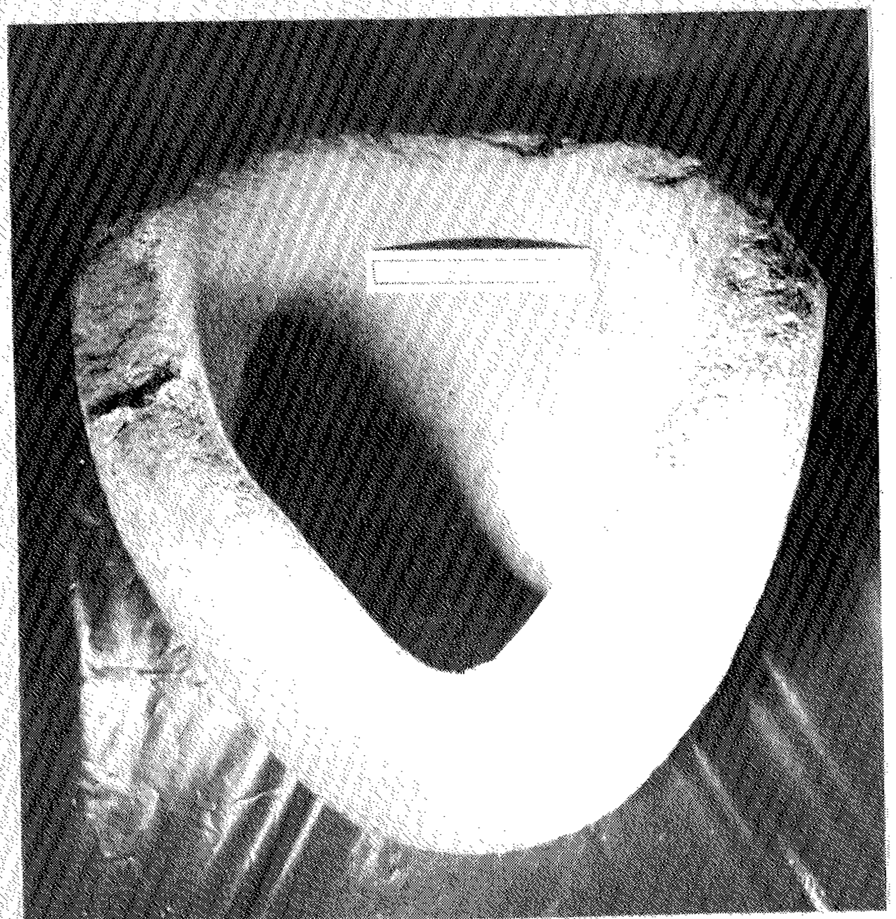


Bb

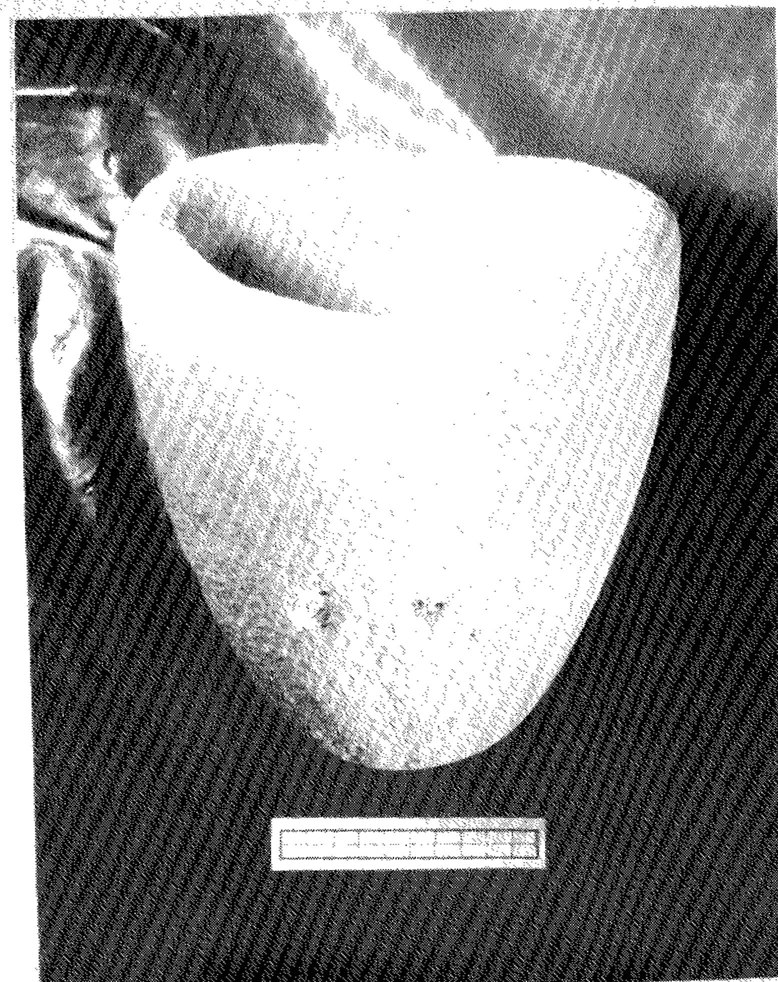


Cc

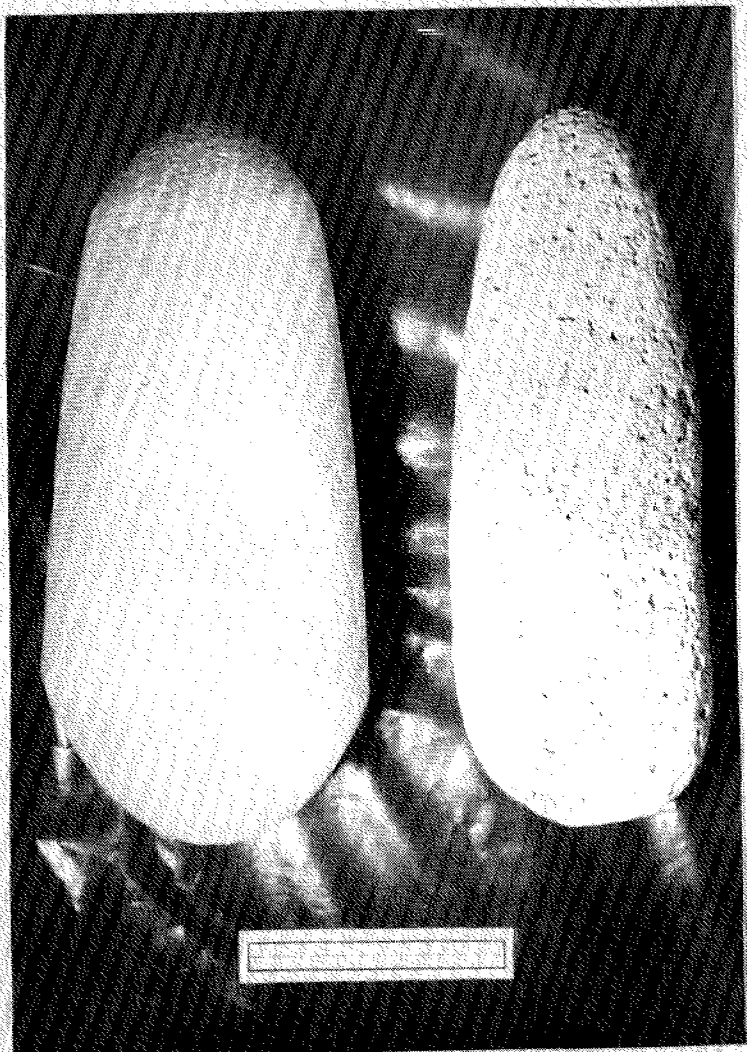
Dd



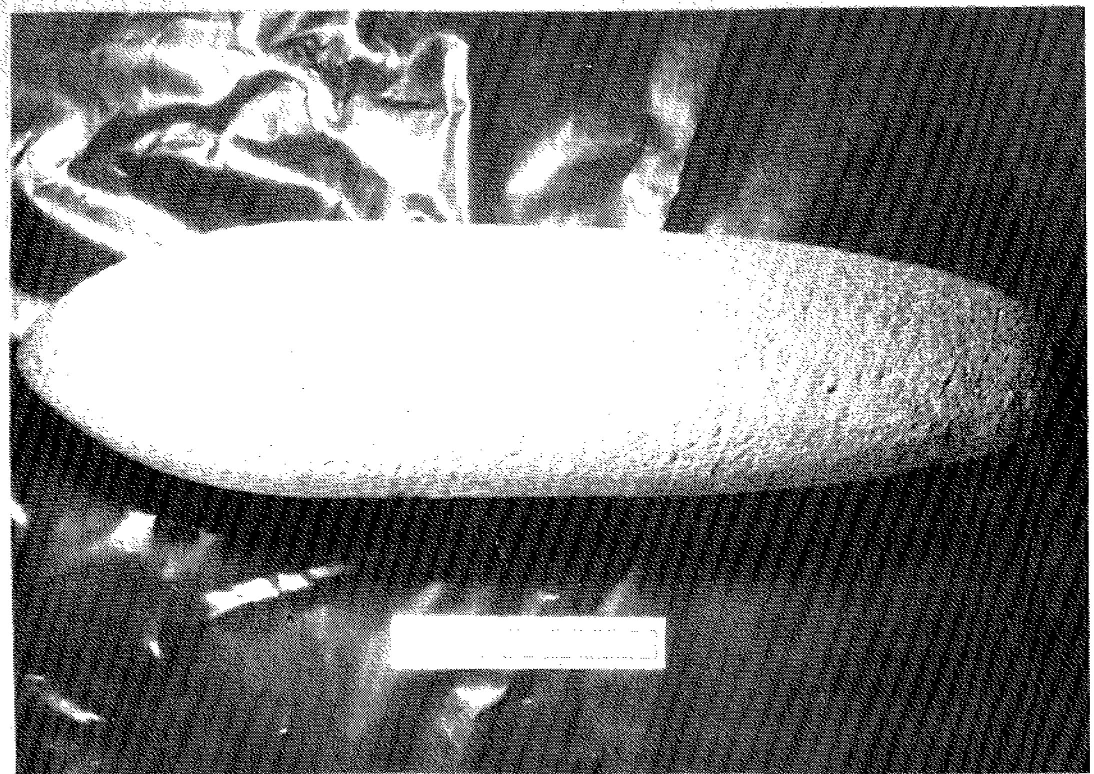
Ee



Ff



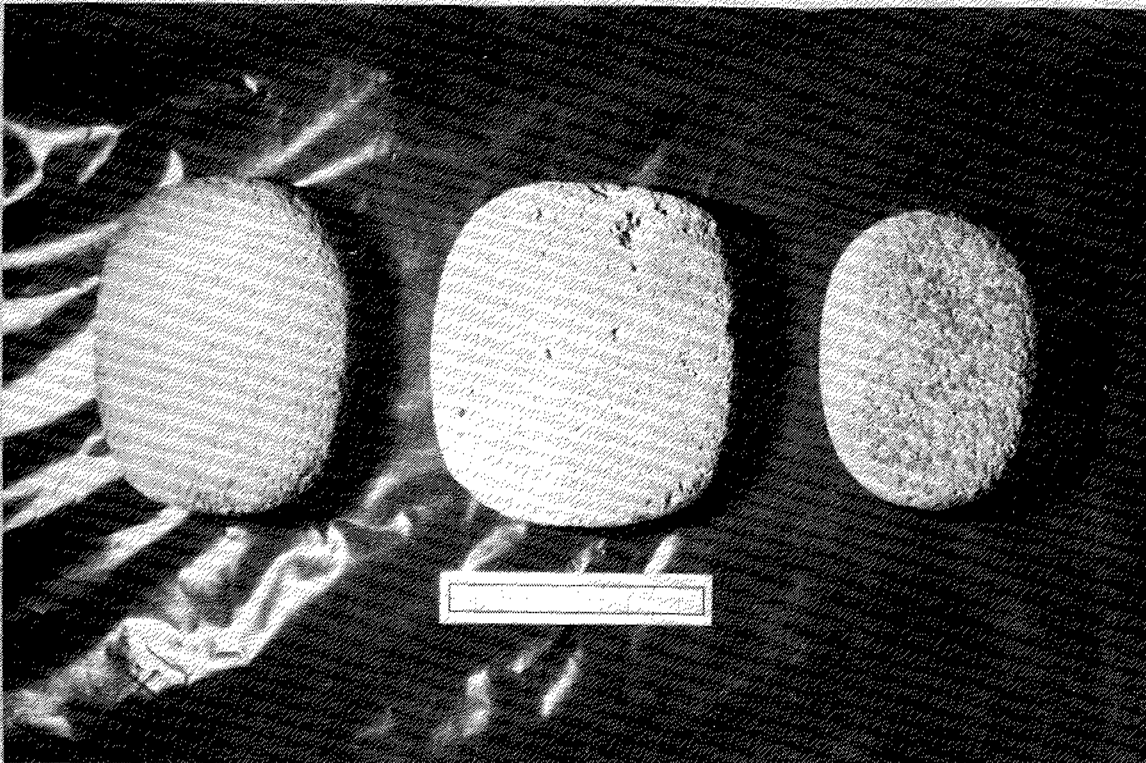
Gg



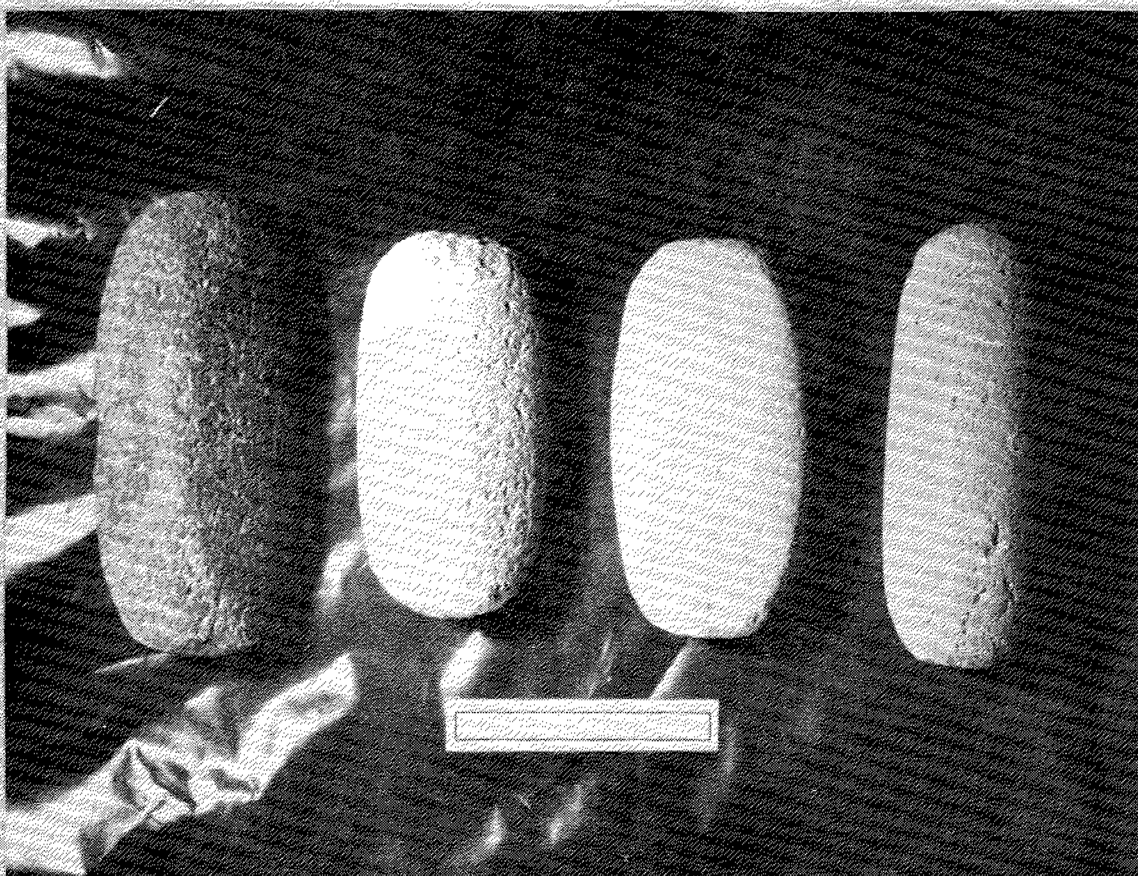
Hh

Ii

Ji



Kk



Ll

DATE DUE
